APPENDIX D

LISTINGS OF DETAILED PROCESS SPREADSHEETS

D-1: 100% DRI CHARGED TO EAF - 1.0% CARBON

D-2: 100% DRI CHARGED TO EAF - 2.5% CARBON

D-3: 30% DRI CHARGED TO EAF - 1.0% CARBON

D-4: 100% SCRAP CHARGED TO EAF

APPENDIX D-1

100% DRI CHARGED TO EAF - 1.0% CARBON

IMSMBA 13-Sept-1999 (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE) Revision A: OREBODY ASSUMPTIONS

	BASIS:		NOIL
TOTA! PI	TOTAL PLANT PRODUCTION (PRAY PAGIO)	8,000 HRS/YR EAF/LMF/CASTING OPERATION	
700 9	MIT TOWN CONTROLL OF		1 (C = +
467.0		184.5 T/HR ORE1 CONC. NET EFED 68 550%	
2.488		T/HR ORF?	
1.465		T/HD OBE3	
0.000		THE ONES	
1.940	MM TONNES/YEAR GREEN BALL PFITET (+6mm)	TAIN NET URI ORE FEED	IRON UNITS 89.36% AS FE304
1.968	MIM TONNES/YEAR TOTAL INDURATED PELLET	8,000	10.64%
1.836	MM TONNES/YEAR NET INDURATED PET LET (+6mm)		TARGET
1.781	MM TONNES/YEAR FEFT TO DRIEGE	URI PROD.	79.932% Fe RECOV 80.753%
1.089	MM TONNES/YEAR DRI	U.977 SLAB PROD. 1.114 DRI TO SLAB	60.000% Wt.% RECOV 58 900%
0.977	MM TONNES/YEAD NET S. AD DOOD TO THE	CONCENTRATOR DEWATERING	
0.000	MM TONNES/YEAD HOT DAND SLAD	65.0% WT.% SOLIDS IN CONC. THICK, U/F	1.014 RATIO INDIIR /G B DELLET
0.977	MW TONNESIVEAR NET STAR DECRETE	35.0% WT.% SOLIDS IN TAILS. THICK, U/F	
1.000	MM TONNES/YEAR FLOUR STEEL (TARDOTT)		2.0% EAF DUST - WT % OF STAP
0.977	MM TONNES/YEAR NET STAR DECOLOT (14 DOCT)	10.0% FILTER FEED O/F - % OF FEED	
	CONCENTRATOR	- 1	1.1% DOLOMITE ADDITION
60.474%	WASTE BOCK -% OF MINED		
3 000%			0.65% MISC ADDIT % DELCH
20 00006	% - INOIS MOIS ON THE STATE OF	4.0% PERCENT DUST - WT.% OF OXIDE FEED	
30.00%	AS-MINED ROCK IRON UNITS - WT. % IRON	3.0% PERCENT -6 mm DRI FINES WT % DDI	
20.000%	ORE ROCK IRON UNITS - WT.% IRON		
%0.0%	GRIZZLY SCREEN 0/S - % OF FEED		
200.0%	CIRCULATING LOAD - +10 mm TO TERTIARY /% EEED)		1.34% REFRACTORIES - % DRI FD
0.0%	PERCENT FEED TO SECONDARY 2 /%)		14.34% EAF SLAG - % DRI FD
0.0%	PERCENT FEED TO TEDTIADY 4.901		2.26% LADLE SCRAP - % M STI
300 0%	BALL MIT CIDE ATMO DATE (C. OT TITE)		
65.0%	BALL MILL CINCOLALING LOAD (% OF FEED)		
35.00%	D.M. OVOLONIE OF PEROPORTION (% OF PERD)		
23.0%	B.M. CYCLONE O/F PERCENT SOLIDS (%)	1.38% SOLIDS IN DRI SCRN DUST - %DRI PROD	
4.00%	GROUND ORE LOSSES TO SLIMES - WT.%	93.00% METALLIZATION - WT % Eat IN DBI	
5.00%	DESLIME CYCLONE O/F PERCENT SOLIDS (%)		
68.21%	STG.1 MAG. CONC. RECOVERY - WT.% OF FEED	6.7% PERCENT DISTYFINES WIT 9, OF O.D.	
86.39%	STG. 1 IRON UNIT RECOVERY - WT.% OF IRON UNITS		
82.30%	STG. 2 MAG. CONC. WT. RECOVERY - WT.% OF FEED		
%05'86	STG. 2 MAG. CONC. IRON UNIT RECOV WT.% OF ILL		
%09.86	STG. 3 MAG. CONC. RECOV - WT % OF FEED		0.64% SLG FR. LMF - %MS
99.50%	STG. 3 MAG. CONC. IRON JINIT BECOM. WAT % OF 111		0.060 ARGON TO LMF - NM3/T MS
200.00%	REGRIND MILL CIDOLII ATINO LOAD W. OT TITTE		0.50% SLAB SCA! F - %MS
65.00%	DECEMBER 1 STOCK ALING LOAD (% OF FEED)	_	
%00 go	OF TATEORY POLICY (WI.70)	0.6% BINDER TO PELLET - % OF FEED	-
99.00 /0	S-FLOTATION IRON CONG - WT.% OF FEED	2.0% DOLOMITE TO PELLET - % OF FEED	_
93.50%	S-FLUIA IION IRON UNIT RECOV WT.% OF IU	0.0% LIMESTONE TO PELLET - % OF FEFD	
97.30%	GAN. REJECT. MAG. SEP WT.% OF FEED	0.0% HYDRATED LIME TO PELLET - % OF FEED	
98.57%	GAN. REJECT. MAG. SEP WT.% OF IU	0.0% EXCESS PELLETS TO SALES . % OF TOTAL	23.50 % WE'VE IN EAT SLAG
KED = ASSU	KED = ASSUMPTION INPUT (DATA OR EXPERIENCE)	BLUE = DERIVED VARIABLE	

IMSMBA
13-Sept-1999
(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)
Revision A: ORRON ORE CONCENTRATOR (PFD-002)

STREAM	STREAM I ARI F	001100 /0	041.00					
NUMBER		SOLIDS %	(MM T/YR)	(MM T/YR)	TOTAL	SOLIDS %	%Fe	Fe UNITS
1001	AS-MINED ROCK	%0′26	6.294	0.195	6.488	353.4%	30.00%	(MM 1/YR)
1002	WASTE ROCK	%0'.26	3.806	0 118	3 00%	2 67	2000	000
	IRON ORE TO CONCENTRATOR (CRUSHING)	%0 25		2 1	7.924	213.7%	16.93%	0.644
r		2		0.07	2.564	139.7%	20.00%	1.244
۷	FRODUCT FROM PRIMARY CRUSHER (80% -130 mm)	97.0%	2.488	0.077	2.564	139.7%	20.00%	1.244
ო	FEED TO GRIZZLY (Secondary 1)	%0′.26	2.488	720.0	2.564	139.7%	20.00%	1.244
m	a FEED TO GRIZZLY (Secondary 2)	%0.78	0.000	0.000	0.000	0.0%	50.00%	0.000
4	OS FROM GRIZZLY (Secondary 1)	%0'.26	1.741	0.054	1.795	97.8%	20,00%	0.871
4	a OS FROM GRIZZLY (Secondary 2)	%0'.26	0.000	0.000	0.000	0.0%	20.00%	0000
5	US FROM GRIZZLY (Secondary 1)	%0'.26	0.746	0.023	0.769	41.9%	20.00%	0.373
и •	uS FROM GRIZZLY (Secondary 2)	%0'26	0.000	0.000	0.000	0.0%	20.00%	000 0
g.	US FROM SECONDARY 1 (80% -37 mm)	97.0%	1.741	0.054	1.795	%8′26	50.00%	0.871
6 2	US FROM SECONDARY 2 (80% -37 mm)	%0'.26	0.000	0.000	0.000	%0.0	50.00%	0000
7	TOTAL FEED TO TERTIARY CRUSHERS (+10 mm)	%0'.26	4.975	0.154	5.129	279.4%	50.00%	2.488
7 a	US FROM TERTIARY 1 (80% -10 mm)	%0'.26	1.658	0.051	1.710	93.1%	20.00%	0.829
7 b	US FROM TERTIARY 2 (80% -10 mm)	%0'26	1.658	0.051	1.710	93.1%	50.00%	0.829
7 c	US FROM TERTIARY 3 (80% -10 mm)	97.0%	1.658	0.051	1.710	93.1%	20.00%	0.80
D 2	US FROM TERTIARY 4 (80% -10 mm)	%0'.26	0.000	0.000	0.000	%0.0	20 00%	0000
\$	TOTAL FEED TO TERTIARY SCREENS	%0.76	7.463	0.231	7.693	419.1%	50.00%	3 731
<u>თ</u>	UNDERSIZE FROM TERTIARY SCREENS (-10 mm)	92.0%	2.488	0.077	2.564	139.7%	20.00%	1.244
10	TOTAL FEED TO BALL MILLS (-10 mm)	%0.76	2.488	0.077	2.564	139.7%	20.00%	1.244

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

IMSMBA

13-Sept-1999 IRON ORE CONCENTRATOR (PFD-002)

IMSMBA

	STREAM LABLE	SOLIDS %	DRY SOLIDS	Liguid	TOTA!	% 501 105	77.00	
NOMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRIFD	%re (DRY)	(MM T/YR)
10 a	a FEED TO BALL MILLS 1&2 (-10 mm)	%0'.26	1.244	0.038	1.282	%8'69	\$0.00%	0.622
10 b	b FEED TO BALL MILLS 3&4 (-10 mm)	%0'.26	1.244	0.038	1.282	%8'69	20.00%	0.622
<u> </u>	TOTAL FEED TO BALL MILLS (-10 mm)	97.0%	1.244	0.038	1.282	%8'69	20.00%	0.622
17 a	a FEED TO BALL MILL 1 (-10 mm)	%0'.26	0.622	0.019	0.641	34.9%	20.00%	0.311
11 0	b FEED TO BALL MILL 2 (-10 mm)	%0'26	0.622	0.019	0.641	34.9%	20.00%	0.311
11 c	c FEED TO BALL MILL 3 (-10 mm)	%0'.26	0.622	0.019	0.641	34.9%	80.00%	0.311
11 d	d FEED TO BALL MILL 4 (-10 mm)	80.78	0.622	0.019	0.641	34.9%	50.00%	0.311
12	TOTAL FEED TO BALL MILL CYCLONES	65.0%	6.219	3.349	9.568	349.2%	50.00%	3,109
13	TOTAL B.M. CYCLONE UNDERFLOW	21.4%	3.731	13.679	17.410	209.5%	50.00%	1.866
4	TOTAL B.M. MAKEUP WATER	%0.0	0.000	14.950	14.950			
15	TOTAL B.M. CYCLONE OVERFLOW	35.0%	2.488	4.620	7.107	139.7%	20.00%	1.244
21	ORE SLIMES TO TAILINGS	80.9	0.114	2.174	2.289	6.4%	29.80%	0.034
22	DE-SLIMED ORE TO MAG. SEP.	49.3%	2.373	2.446	4.819	133.3%	50.97%	1.210
23	MAG. SEP. 1 DILUTION WATER	%0.0	0.000	31.600	31.600			
24	NET FEED TO MAG. SEP. 1	6.5%	2.373	34.046	36.419	133.3%	50.97%	1.210
25	MAG. SEP 1 TAILS	11.9%	0.754	5.585	6.339	42.4%	21.70%	0.164
79	MAG. SEP. 1 CONC.	5.4%	1.619	28.461	30.080	%6'06	64.62%	1.046
27	MAG. SEP. 2 DILUTION WATER	%0:0	0.000	14.300	14.300		· • • • • • • • • • • • • • • • • • • •	
28	NET FEED TO MAG. SEP. 2	3.6%	1.619	42.761	44.380	%6.06	64.62%	1.046
29	MAG. SEP 2 TAILS	1.5%	0.076	4.996	5.072	4.3%	21.94%	0.017
30	MAG. SEP. 2 CONC.	3.9%	1.543	37.765	39.308	86.6%	66.72%	1.029

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

IMSMBA
13-Sept-1999 IRON ORE CONCENTRATOR (PFD-002)
STREAM

4 of 13

NUMBER	31			32	33	34	35	36	3.7	 -	38	39	40
STREAM LABLE	MAG. SEP. 3 DILUTION WATER			NET FEED TO MAG. SEP. 3	MAG. SEP 3 TAILS	MAG. SEP. 3 CONC.	REGRIND MILL DISCHARGE	NET FEED TO REGRIND MILL CYCLONE		NEGRIND MILL CYCLONE O/F PRODUCT TO FLOTATION	REGRIND MILL CYCLONE U/F TO MILL	REGRIND MILL DILUTION WATER	FLOTATION DILUTION WATER
% SOLIDS	0.0%			2.9%	1.5%	2.9%	65.0%	% 7%	3	2.9%	65.0%	%0.0	%0.0
DRY SOLIDS	⊥		`	 1.543	0.022	1.521	3 042	7 563	2	1.521	3.042	0.000	0.000
LIQUID	13.900	,, ,		51.665	1.418	50.247	1 638	200000000000000000000000000000000000000	000.10	50.247	1.638	0.000	5.100
TOTAL	(MIM 1/YK) 13.900			 53.208	1.440	51 768		000.4	56.448	51.768	4.680	0.000	5.100
% SOLIDS	OF DRIFE			86.6%	1 2%	85.40		%8.071	256.3%	85.4%	170.8%		
%Fe	(DRY)			 %22	23.50	,4cc +3	0,00.10	00.0	67.33%	67.33%	67.33%		
Fe UNITS	(MM T/YR)		 	 4 020				0.000	3.073	1.024	2.048	?	

IMSMBA

13-Sept-1999

(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)

Revision A: ORIGON ORE CONCENTRATOR (PFD-002)

STREAM	STREAM STREAM	, co. , co.						
NUMBER		% SULIDS	(MM T/YR)	(MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS
74	FLOTATION CHEMICALS	%0:0		0.050	0.050			(\$11.7)
42	NET FLOTATION FEED	2.7%	1.521	55.397	56.918	85.4%	67.33%	1.024
43	FLOAT TAILS - Fe CONC, TO MAG, IV	2.6%	1.506	55.355	56.861	84.6%	%29.29	1.019
44	SULFUR FLOAT REJECTS TO TAILS	27.0%	0.015	0.041	0.056	%6.0	33.67%	0.005
45	MAG. SEP. 4 CONC.	2.7%	1.465	52.682	54.147	82.3%	68.56%	1.005
46	MAG. SEP. 4 GANGUE REJECT TO TAILS	1.5%	0.041	2.674	2.715	2.3%	35.69%	0.015
47	CONCENTRATE TO PIPELINE FEED	65.0%	1.465	0.789	2.254	82.3%	68.56%	1.005
48	EXCESS WATER FROM CONC. THICK. TO P.W. POND	%0:0	0.000	51.893	51.893		•	
49	TOTAL REJECTS TO TAILS	5.7%	1.022	16.888	17.911	57.4%	23.40%	0.239
50	DEWATERED TAILINGS TO DISPOSAL	35.0%	1.022	1.899	2.921	57.4%	23.40%	0.239
51	TAILS THICKENER DECANT TO P.W. POND	%0.0	0000	14.990	14.990			
52	EXCESS WATER FROM TAILS POND	%0:0	0.000	1.388	1.388			
53	FRESH WATER MAKEUP TO P.W. POND	%0.0	0.000	5.232	5.232			
54	EVAPORATION FROM P.W. POND	%0.0	0.000	3.675	3.675			
	TOTAL INPUTS TO P.W. POND	%0.0	0.000	73.502	73.502			
55	TOTAL CONCENTRATOR WATER INPUTS	%0:0	0.000	79.900	79.900			
						_	_	

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

			SOLIDS %
			TOTAL
BALANCE	4RGE)		TIONID
ER & SOLIDS	100% DRI CH/		% SOLIDS DRY SOLIDS LIQUID
KING WAT	URNACE -		% SOLIDS
BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE		Revision A: ORPIPELINE & ORE RECEIVING (PFD-003)	STREAM LABLE
MSMBA	13-Sept-1999	Revision A:	STREAM

STREAM	STREAM LABLE	sorids %	DRY SOLIDS	rionib	TOTAL	% SOLIDS %	%Fe	Fe UNITS
			(MM 1/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
43	CONCENTRATE SLURRY FROM PIPELINE	65.0%	1.465	0.789	2.254	82.3%	%95.89	1.005
101	CONCENTRATE FEED TO DEWATERING	65.0%	1.465	0.789	2.254	82.3%	68.56%	1.005
102	NET FILTER FEED	%0.09	2.098	1,399	3.497	117.8%	70.54%	1.480
103	FEED SLURRY DIVERSION TO THICKENERS	%0'59	0.000	0.000	0.000	%0.0	68.56%	0.000
104	FILTER CAKE	92.0%	1.888	0.164	2.053	106.0%	70.54%	1.332
105	FILTRATE	0.0%	0.000	1.095	1.095			
106	FILTER O/F	90.09	0.210	0.140	0.350	11.8%	70.54%	0.148
107	LAUNDER WASH-DOWN WATER	%0.0	00.00	669.0	0.699			
108	NET FILTER O/F RETURN	20.0%	0.210	0.839	1.049	11.8%	70.54%	0.148
109	THICKENER FEED	50.6%	2.098	2.052	4.150	117.8%	70.54%	1.480
110	THICKENER DECANT	%0.0	0.000	0.653	0.653			
111	THICKENER U/F	%0.09	2.098	1.399	3.497	117.8%	70.54%	1.480
112	EXCESS WATER TO PROCESS WATER	0.0%	0.000	1.747	1.747	-		

IMSMBA
13-Sept-1999
(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)
Revision A: ORSTOCKPILE, PELLET PLANT SLURRY/FINES HANDLING (BFD-004)

STREAM	STREAM LABLE % SOLI	% SOLIDS	DRY SOLIDS	מוזוטו	TOTAL	78 041 100	ļ	
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	%Fe (DRY)	(MM T/VD)
201	RECYCLE EAF DUST SLURRY	15.0%	0.020	0.112	0.132	1.1%	48.50%	0.010
202	RECYCLE DRI DUST SLURRY	15.0%	0.169	0.957	1.125	9.5%	87.47%	0.148
203	P.P. DUST/FINES SLURRY	15.0%	0.123	0.697	0.820	6.9%	67.81%	0.083
204	P.P. DUST SYSTEMS O.S.	80.0%	0.047	0.012	0.059	2.6%	67.81%	0.032
205	FEED TO P.P. THICKENER	18.5%	0.423	1.860	2.283	23.8%	77.42%	0.328
206	DECANT FROM P.P. THICKENER	%0.0	0.000	1.437	1.437	-		
207	U/F FROM P.P. THICKENER TO FEED THICK.	20.0%	0.423	0.423	0.847	23.8%	77.42%	0.328
208	DRI CLASSIFIER O/S	75.0%	0.057	0.019	0.075	3.2%	87.80%	0.050
209	-6 mm ORE/PELLET FINES	100.0%	0.055	0.000	0.055	3.1%	67.81%	0.037
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	67.81%	0.000
211	TOTAL FEED TO MILLING	83.8%	0.159	0.031	0.189	8.9%	74.93%	0.119
212	MILL MAKE-UP WATER	0.0%	0.000	0.075	0.075	0.0%		<u> </u>
213	GROUND FINES SLURRY TO P.P. THICKENER	%0'09	0.159	0.106	0.265	8.9%	74.93%	0.119
232	INDURATED PELLETS TO STOCKPILE	100.0%	1.836	0.000	1.836	103.1%	67.81%	1.245
250	RECLAIMED PELLETS	100.0%	1.836	0.000	1.836	103.1%	67.81%	1.245
251	LUMP ORE3 TO STOCKPILE	%0′26	0.000	0.000	0.000	%0.0	%00.0	0.000
252	RECLAIMED LUMP ORE	%0'.26	0.000	0.000	0.000	0.0%	0.00%	0.000
253	PELLET/LUMP ORE TO FEED SILOS	100.0%	1.836	0.000	1.836	103.1%	67.81%	1.245
254	EXCESS PELLETS TO SALES	%0.0	0.000	0.000	0.000	%0.0	67.81%	0.000
							-	_

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

IMSMBA

13-Sept-1999

(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)

Revision A: ORGREEN BALL PELLET PRODUCTION: (BFD-005)

STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	dilloi	TOTAL	% SUI IOS	0/ 50	O.E.
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
104	FILTER CAKE TO PELLET PLANT	92.0%	1.888	0.164	2.053	106.0%	70.54%	1.332
218	NET OXIDE FEED TO PELLETIZING	91.9%	1.969	0.173	2.142	110.6%	70.47%	1.388
219	PELLETIZING WATER	%0.0	0.000	0.027	0.027	%0.0		
220	COKE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0		
221	BINDER TO PELLETIZING	100.0%	0.012	0.000	0.012	%2.0	11.60%	0.001
222	DOLOMITE TO PELLETIZING	100.0%	0.040	0.000	0.040	2.3%	1.61%	0.001
223	LIMESTONE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0:0		•
224	HYDRATED LIME TO PELLETIZING	100.0%	0.000	0.000	0.000	%0:0	•	•
225	PELLET FEED MIXTURE	91.0%	2.021	0.200	2.221	113.5%	68.76%	1.390
226	DISC DRESSING MOISTURE	%0.0	000.0	0.012	0.012	%0.0		
227	GREEN BALL PELLETS	%9.06	2.021	0.212	2.233	113.5%	68.76%	1.390
228	COMBINED GREEN BALL O/S & U/S	90.5%	0.081	0.008	0.089	4.5%	68.76%	0.056
229	SIZED GREEN BALL PELLETS	90.5%	1.940	0.204	2.144	109.0%	68.76%	1.334

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)

Revision A: ORINDURATED PELLET PRODUCTION: (BFD-006)

13-Sept-1999 IMSMBA

STREAM	STREAM LABLE	% sorids	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS %	%Fe	Fe UNITS
229	SIZED GREEN BALL PELLETS	90.5%	1.940	0.204	2.144	109.0%	68.76%	1.334
230	INDURATED PELLETS (GROSS)	100.0%	1.968	0.000	1.968	110.5%	67.81%	1.334
231	INDURATED PELLETS (NET)	100.0%	1.836	0.000	1.836	103.1%	67.81%	1.245
232	CRUSHED OVERSIZE PELLETS	100.0%	0.000	0.000	0.000	0.0%	67.81%	0.000
233	UNDERSIZE INDURATED PELLETS	100.0%	0.000	0.000	0.000	0.0%	67.81%	000.0
234	RECYCLED INDURATED PELLET DUST/FINES	100.0%	0.132	0.000	0.132	7.4%	67.81%	680.0
235	P.P. DUST SLURRY WATER	%0'0	0.000	0.697	0.697			
203	P.P. DUST SLURRY TO PELLET FEED	15.0%	0.123	269.0	0.820	6.9%	67.81%	0.089
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	67.81%	0.000
			_	-				

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)

13-Sept-1999 IMSMBA

Revision A;	Revision A: ORDRI SYSTEMS, 1 OF 2 (PFD-007)			,			4	
NUMBER	OIREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS
253	RECLAIMED PELLETS/LUMP ORE	100.0%	1.8358	0.0000	1.8358	103.1%	67.81%	
209	-6 mm OXIDE TO PELLETIZING (ORE/PELLETS)	100.0%	0.0551	0.0000	0.0551	3.1%	67.81%	
299	REMET (OTHER) CHARGED TO SHAFT FCE.	100.0%	0.0000	0.0000	0.0000	0.0%	67.81%	0.0000
300	NET ORE/PELLETS, ETC. TO SHAFT FCE.	100.0%	1.7807	0.0000	1.7807	100.0%	67.81%	1.2075
301	COATING LIME	100.0%	0.0095	0.0000	0.0095	0.5%		···
302	LIME COATING WATER	%0:0	0.0000	0.0284	0.0284	%0.0		
303	NET FURNACE FEED	98.4%	1.7902	0.0284	1.8186	100.5%	67.45%	1.2075
304	OFF-GASSES (INCL. DUSTAWV)	24.5%	0.1661	0.5121	0.6783	9.3%	87.80%	0.1459
305	GAS QUENCH SCRUB WATER (MM TPY)	%0.0	0.0000	73.6071	73.6071	%0.0		
306	FURNACE DUST TO DUST SCRUBBERS	100.0%	0.0302	0.0000	0.0300	1.7%	87.80%	0.0264
307	FURNACE DUST SCRUB WATER	%0:0	0.0000	2.3448	2.3448	0.0%		
308	FCE DUST SLURRY TO CLASSIFIER	1.3%	0.0300	2.3448	2.3748	1.7%	87.80%	0.0264
309	GAS QUENCH SCRUBBER BLOWDOWN	%9'9	0.1661	2.3448	2.5109	9.3%	87.80%	0.1459
208	COARSE SOLIDS FROM CLASSIFIER	75.0%	0.0565	0.0188	0.0754	3.2%	87.80%	0.0496
310	DE-GRITTED FCE, SCRUB BLOW-DOWN	92.0%	0.1396	4.6707	4.8103	7.8%	87.80%	0.1226
311	PRODUCT SILO SCRUBBER BLOW-DOWN	0.4%	0.0062	1.6079	1.6140	0.3%	92.80%	0.0057
312	OXIDE SCREEN SCRUBBER BLOW-DOWN	100.0%	0.0080	1.6079	1.6159	0.5%	67.81%	0.0055
313	COMPRESSOR COOLING WATER	%0.0	0.0000	6.6994	6.6994	0.0%	•	
314	PRODUCT SCREEN SCRUBBER	%9.0	0.0150	2.3448	2.3598	0.8%	92.80%	0.0139
315	NET CLARIFIER FEED	0.2%	0.1688	91.0498	91.2186	9.5%	87.47%	0.1477

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

IMSMBA BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE 13-Sept-1999 (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)
Revision A: ORDRI SYSTEMS, 2 OF 2 (PFD-008)

STREAM	STREAM LABLE	SCHOS %	adi los vad					
NUMBER		2	(MM T/YR)	(MM T/YR)	MM TAD	SOLIDS %	%Fe	Fe UNITS
346	OLAR DECANT TO COOLING SYSTEMS				(%)	טין טאן דט	(DRY)	(MM T/YR)
	CENTRAL TO COOPING STOLEMS	%0.0	0.0000	90.093	90.093	0.0%		
317	DRI TO SCREENS	100.0%	1.0886	0.000	1.089	61.1%	92 80%	4 0402
318	DRI WITH FINES REMOVED	100.0%	1.0450	0000	1.045	58 70%	0000	70.0
319	DRI FROM SILOS	100 00%	0.4	0			97.00.76	0.9698
6		90	00#0	0.000	1.045	28.7%	92.80%	0.9698
026	EACESS DRITO SALES	100.0%	0.0000	0.000	0.000	%0.0	92.80%	0.0000
321	DRI TO EAF STORAGE HOPPERS	100.0%	1.0450	0.000	1.045	58.7%	92.80%	0 9698
322	GAS QUENCH O/F WATER TO CLARIFIER	%0.0	0.0000	74.119	74.119	%00		
323	INERT GAS (MM Nm3/YR)	0.0%	0.0000	43.000	43.000	%00		
324	DRI SCREEN FINES TO EAF INJECTION	100.0%	0.0435	000.0	0 044	7 70%	200	
					2	0/ ‡.7	32.80%	0.0404

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE)

IMSMBA

13-Sept-1999 (BASE CASE:
Revision A: ORFAF STEFI MAKING! MF (PED-009)

Revision A:	Revision A: OREAF STEELMAKING/LMF (PFD-009)	BASIS:	8,000	HRS/YR EAF/LN	8,000 HRS/YR EAF/LMF/CASTING OPERATION	RATION		
NUMBER	SI KEAM LABLE	SOLIDS %	DRY SOLIDS	LIQUID (MM T/YR)	TOTAL (MM T/VR)	% OF SLAB	%Fe	Fe UNITS
;				(*)	(3)		(iva)	(NI III IIIIIII)
400	TOTAL DRI FEED TO EAF	100.0%	1.089	0.000	1.089	61.1%	92.80%	1.010
401	LUMP LIME FLUX TO EAF	100.0%	0.012	0.000	0.012	%2'0		
402	SILICA FLUX	100.0%	0.000	0.000	0.000	%0.0		
403	MISC. ADDITIVES (Al, FeMn, FeSi, etc.)	100.0%	400.0	0.000	0.007	1.8%	40.72%	0.013
404	STEEL CARBON (CHARGED+SLAG INJ.)	100.0%	0.012	0,000	0.012	3.0%		
405	EAF ELECTRODES	100.0%	0.004	0.000	0.004	0.5%		
406	TOTAL EAF COOLING WATER CIRC. (MM NM3/YR)	%0.0	0.000	70.627	70.627	%0.0		
407	REVERT SCRAP	100.0%	0.048	0.000	0.048	2.7%	89.70%	0.048
408	PURCHASED SCRAP	100.0%	0.016	0.000	0.016	%6:0	99.70%	0.016
409	NET SCRAP CHARGED	100.0%	0.065	0.000	0.065	3.6%	%02.66	0.065
410	TOTAL FLUX & ADDITIVES CHARGED	100.0%	0.031	0.000	0.031	1.8%	41.32%	0.013
411	REFRACTORIES CONSUMMED	100.0%	0.015	0.000	0.015	%8'0		
412	PROCESS/COOLING WATER OUT OF EAF (MM NM3/YR)	%0.0	0.000	70.627	70.627	0.0%		
413	EAF SLAG (LIQUID)	%0.0	0.000	0.156	0.156	0.0%	25.60%	0.040
414	EAF DUST TO EAF DUST COLLECTION	100.0%	0.020	0.000	0.020	1.1%	48.50%	0.010
415	OXYGEN GAS TO FURNACE (MM Nm3/YR)	%0.0	0.000	11.000	11.000	%0:0		
416	LIQUID EAF STEEL TO LADLE REFINING	0.0%	0.000	1.054	1.054	%0:0	%02'66	1,051
417	PULVERIZED LIME TO LADLE REF. FCE.	100.0%	0.005	0.000	0.005	0.3%		
418	SLAG/WIRE DESULFURIZER TO LRF	100.0%	0.0004	0.0000	0.0034	0.5%		
419	ARGON GAS TO LRF (MM Nm3/YR)	%0.0	0.000	0.063	0.063	0.0%		

D.O.E. IRONMAKING - BASE CASE 100% SHAFT FCE. DRI TO EAF, 1.0 WT.% CARBON (Rev. 2)

0.000

99.70%

0.0%

0.000

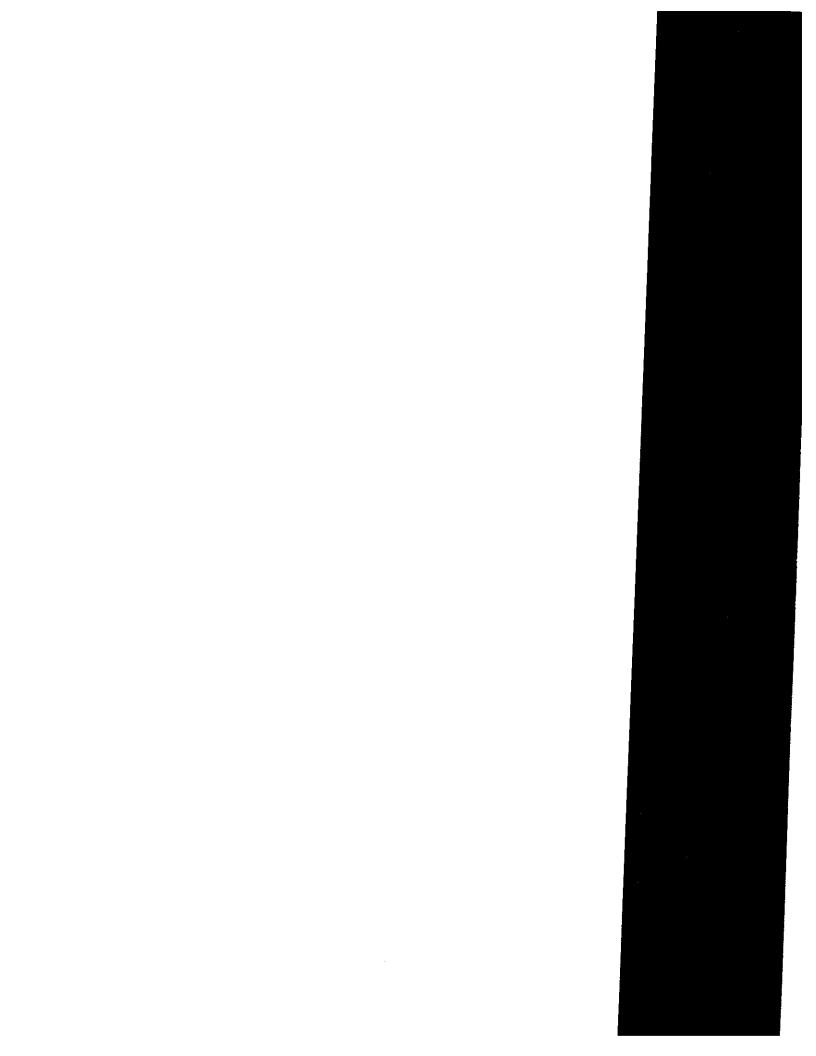
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0.000

100.0%

HOT BAND TO SALES

13-Sept-1999	BASE CASE INCINSTE	JRNG WAJE	ELMAKING WATER & SOLIDS BALANCE AFT FURNACE - 100% DRI CHARGE)	BALANCE ARGE)				13 of 13
Revision A:	OREAF STLMAKING/LMF (PFD-009), CASTING (PFD-	BASIS:	0	0 (MM T/YR)				
STREAM NUMBER	STREAM LABLE	% SOLIDS	DRY SOLID (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	% OF SLAB OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
420	SLAG & LOSSES FROM LRF	0.0%	0.000	0.007	0.007	%0'0	31.80%	0.002
421	REFINED STEEL TO CASTING	%0.0	0.000	1.052	1.052	%0.0	%02'66	1.049
422	PULVERIZED LIME FLUX TO EAF	100.0%	0.042	0.000	0.012	%2.0		
423	WATER FOR EAF DUST TRANSPORT	%0.0	0.000	0.112	0.112	0.0%		
424	PROC. COOLING WATER LMF	%0.0	0.000	14.125	14,125	%0'0		
425	TOTAL SLAG OUTPUT (AS SOLID)	100.0%	0.156	0.000	0.156	8.8%	26.97%	0.042
501	SLAB SCALE	%0.0	0.005	0.000	0.005	0.3%	80.00%	0.004
502	LADLE SCRAP	%0.0	0.024	0.000	0.024	1.3%	%02.66	0.024
503	TUNDISH SCRAP	100.0%	0.006	0.000	0.006	0.4%	%04.66	0.006
504	CROP END SCRAP	%0.0	0.018	0.000	0.018	1.0%	%02'66	0.018
505	MOLD POWDER TO CASTING	100.0%	0.0006	0.000	0.001	4.8%		
506	TUNDISH POWDER TO CASTING	100.0%	0.0003	0.000	0000	1.5%		
507	MOLD COOLING WATER (MM NM3/YR)	0.0%	0.000	29.206	29.206	%0.0		
208	CONTACT COOLING WATER (MM NM3/YR)	0.0%	0.161	9.600	9.761	9.1%		
509	NET STEEL TO CASTING	%0.0	0.000	656.0	0.999	%0.0	%07.66	0.996
510	TOTAL CAST SLAB PRODUCT	100.0%	0.977	0.000	0.977	54.9%	%02'66	0.974
511	THIN SLAB TO HOT BAND	#DIV/0i	0.000	0.000	000.0	%0.0	%02'66	0.000
512	SLABS TO SALES	100.0%	0.977	0.000	0.977	54.9%	89.70%	0.974



APPENDIX D-2

100% DRI CHARGED TO EAF - 2.5% CARBON

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

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DOE10025 08-June-2000

	BASIS:	7,940	ION	
TOTAL PLA	TOTAL PLANT PRODUCTION (DRY BASIS):	6,000 HRS/YR EAF/LMF/CASTING OPERATION		_
6.301	MM TONNES/YEAR AS-MINED ROCK	184.8 T/HR ORE1 CONC. NET FEED	OROG IN GAINII NOGI	Ε,
2.491	MM TONNES/YEAR NET ORE TO CONCENTRATOR	T/HR ORF?	INCIN UNITS IN CONC. 68.560%	9
1.467	MM TONNES/YEAR NET CONCENTRATE	T/HR ORE3		
0.000	MM TONNES/YEAR LUMP ORE3	RI ORE FEED	/850 00	—;
1.943	MM TONNES/YEAR GREEN BALL PELLET (+6mm)	T/HR SLAB PRODUCED	09.30%	4 (
1.970	MM TONNES/YEAR TOTAL INDURATED PELLET		10.04%	2
1.838	MM TONNES/YEAR NET INDURATED PELLET (+6mm)	1.107 DRI PROD. 1611 ORE/P TO DRI	19 / COLD 11	ii s
1.783	MM TONNES/YEAR FEED TO DRI FCE.	SLAB PROD. 1.132	W# % DECOY	
1.107	MM TONNES/YEAR DRI	RATOR DEWATE		aT
0.977	MM TONNES/YEAR NET SLAB PRODUCT (BALANCE)	65.0% WT.% SOLIDS IN CONC. THICK 11/F		
0.000	MM TONNES/YEAR HOT BAND SLAB	35.0% WT.% SOLIDS IN TAILS. THICK, U/F		
0.977	MM TONNES/YEAR NET SLAB PRODUCT	0.0% FEED DIVER. TO THICK - % OF FEED	2 100 CAT PLIST WET 1/ OF C	_
1.000	MM TONNES/YEAR LIQUID STEEL (TARGET)			
0.977	MM TONNES/YEAR NET SLAB PRODUCT (TARGET)	DRI PLANT	4.4% DO CAT INC WI.% UKI	_
	CONCENTRATOR	3.0% PERCENT OF PF11 FT FINES - WT % DE1		
60.474%	WASTE ROCK - % OF MINED			
3.000%	AS-MINED ROCK MOISTURE - %			
30.000%	AS-MINED ROCK IRON ILINE - W. W. T.W ATINITY - WINED ROCK IRON IN			
20.000%	ORE BOCK IBON TINITS - WE'S WON			
70 00%	STATE OF THE WORLD AND THE PROPERTY OF THE PRO		3.87% PUL. LIME EAF - % DRI FD	
200 00%	CIDELLI ATMOLOGE ASSETTATION OF THE TOTAL OF		1.34% REFRACTORIES - % DRI FD	
%0.007	DEPOTATIONS LOAD - +10 mm 10 JEKIJARY (% FEED)		14.34% EAF SLAG - % DRI FD	
0.0%	PERCENI FEED 10 SECONDARY 2 (%)		2.26% LADLE SCRAP - % M. STL	
0.0%	PERCENT FEED TO TERTIARY 4 (%)		0.60% TUND, SCRAP - % M. STI	
300.0%	BALL MILL CIRCULATING LOAD (% OF FEED)	0.56% SOLIDS IN SILO DUST - % OF DRI PROD.	-	
65.0%	BALL MILL PERCENT SOLIDS (% OF FEED)	0.45% SOLIDS IN OXIDE SCRN DUST - %DRI FD		
35.0%	B.M. CYCLONE O/F PERCENT SOLIDS (%)	1.36% SOLIDS IN DRI SCRN DUST - %DRI PROD	_	
4.60%	GROUND ORE LOSSES TO SLIMES - WT.%	91.59% METALLIZATION - WT.% Fet IN DRI		
2.00%	DESLIME CYCLONE O/F PERCENT SOLIDS (%)			
68.21%	STG.1 MAG. CONC. RECOVERY - WT.% OF FEED	6.7% PERCENT DUST/FINES - WT % OF G B		
86.39%	STG. 1 IRON UNIT RECOVERY - WT.% OF IRON UNITS			
95.30%	STG. 2 MAG. CONC. WT. RECOVERY - WT.% OF FEED	2.0% PERCENT O/S GREEN BALL PET 1 FTS		
%05.86	STG. 2 MAG. CONC. IRON UNIT RECOV WT.% OF IU			
%09.86	STG. 3 MAG. CONC. RECOV WT.% OF FEED	0.0% PERCENT O/S INDIJRATED PET LETS		
89.50%	STG. 3 MAG. CONC. IRON UNIT RECOV WT.% OF ILL			
200.00%	REGRIND MILL CIRCULATING I DAD (% OF FEED)	_		
65.00%	REGRIND MILL % SOLIDS (MT %)			
%00 66	S.E. OTATION IDON COND. W.T. W.			
00.00	STECTATION INCIN CONC. WIT WE SEED			
99:30/6	CALCIALION INCIN MECOV WI. % OF JO		0.27% SLAG CINJ WT% M. STL	
97.30/0	CAN. REJECT. MAG. SET WI.% OF FEED		25.60% %Fe IN EAF SLAG	
90.37 /0	2	0.0% EXCESS PELLETS TO SALES - % OF TOTAL		
KED = ASSUN	ŀ	BLUE = DERIVED VARIABLE		
NOR HOU	D.O.F. IRONMAKING - SHAFT FIRNACE 100% DRI CHARGE 12 5% C) BO			

D.O.E. IRONMAKING - SHAFT FURNACE, 100% DRI CHARGE (2.5% C) Rev. 2

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

Revision A: ORIRON ORE CONCENTRATOR (PFD-002)

DOE10025 08-June-2000

STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	LIQUID	TOTAL	SOI IDS %	%E0	FoliNITC
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
1001	AS-MINED ROCK	%0'.26	6.301	0.195	6.496	353.5%	30.00%	1.890
1002	WASTE ROCK	%0'.26	3.811	0.118	3.929	213.8%	16.93%	0.645
~	IRON ORE TO CONCENTRATOR (CRUSHING)	%0'.26	2.491	0.077	2.568	139.7%	20.00%	1.245
2	PRODUCT FROM PRIMARY CRUSHER (80% -130 mm)	%0'.26	2.491	0.077	2.568	139.7%	20.00%	1.245
ო	FEED TO GRIZZLY (Secondary 1)	97.0%	2.491	0.077	2.568	139.7%	20.00%	1.245
(Y)	FEED TO GRIZZLY (Secondary 2)	%0'.26	0.000	0.000	0.000	%0.0	20.00%	0.000
4	OS FROM GRIZZLY (Secondary 1)	%0'26	1.743	0.054	1.797	%8'.26	20.00%	0.872
4	OS FROM GRIZZLY (Secondary 2)	%0'.26	0.000	0.000	0.000	%0.0	20.00%	0.000
5	US FROM GRIZZLY (Secondary 1)	%0'.26	0.747	0.023	0.770	41.9%	20.00%	0.374
e Lo	US FROM GRIZZLY (Secondary 2)	%0.76	0.000	0.000	0.000	0.0%	20.00%	0.000
9	US FROM SECONDARY 1 (80% -37 mm)	%0'.26	1.743	0.054	1.797	%8'.26	20.00%	0.872
9	US FROM SECONDARY 2 (80% -37 mm)	%0'.26	0.000	0.000	0.000	%0.0	20.00%	0.000
7	TOTAL FEED TO TERTIARY CRUSHERS (+10 mm)	%0'.26	4.981	0.154	5.135	279.4%	20.00%	2.491
7 a	US FROM TERTIARY 1 (80% -10 mm)	92.0%	1.660	0.051	1.712	93.1%	20.00%	0.830
4 2	US FROM TERTIARY 2 (80% -10 mm)	%0'.26	1.660	0.051	1.712	93.1%	20.00%	0.830
7 c	US FROM TERTIARY 3 (80% -10 mm)	%0'.26	1.660	0.051	1.712	93.1%	20.00%	0.830
7 0	US FROM TERTIARY 4 (80% -10 mm)	%0'.26	0.000	0000	0.000	%0.0	20.00%	0.000
æ	TOTAL FEED TO TERTIARY SCREENS	%0'.26	7.472	0.231	7.703	419.2%	50.00%	3.736
6	UNDERSIZE FROM TERTIARY SCREENS (-10 mm)	%0′26	2.491	0.077	2.568	139.7%	20.00%	1.245
10	TOTAL FEED TO BALL MILLS (-10 mm)	%0'.26	2.491	0.077	2.568	139.7%	20.00%	1.245

D.O.E. IRONMAKING - SHAFT FURNACE, 100% DRI CHARGE (2.5% C) Rev. 2

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE IRON ORE CONCENTRATOR (PFD-002)

DOE10025	BASE CASE IRON/STEEL	ING WATE	"MAKING WATER & SOLIDS BALANCE	BALANCE				3 of 13
STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
10 a	FEED TO BALL MILLS 1&2 (-10 mm)	%0'26	1.245	0.039	1.284	%6:69	20.00%	0.623
10 b	FEED TO BALL MILLS 3&4 (-10 mm)	97.0%	1.245	0.039	1.284	69.9%	50.00%	0.623
*	TOTAL FEED TO BALL MILLS (-10 mm)	97.0%	1,245	0.039	1.284	%6.69	20.00%	0.623
7 .	FEED TO BALL MILL 1 (-10 mm)	%0'.26	0.623	0.019	0.642	34.9%	50.00%	0.311
11 p	FEED TO BALL MILL 2 (-10 mm)	%0.76	0.623	0.019	0.642	34.9%	50.00%	0.311
11 0	FEED TO BALL MILL 3 (-10 mm)	%0'.26	0.623	0.019	0.642	34.9%	50.00%	0.311
110	FEED TO BALL MILL 4 (-10 mm)	%0′26	0.623	0.019	0.642	34.9%	\$0.00%	0.311
12	TOTAL FEED TO BALL MILL CYCLONES	65.0%	6.227	3.353	9.579	349.3%	50.00%	3.113
13	TOTAL B.M. CYCLONE UNDERFLOW	21.5%	3.736	13.677	17.413	209.6%	50.00%	1.868
4	TOTAL B.M. MAKEUP WATER	%0.0	0000	14.950	14,950			
15	TOTAL B.M. CYCLONE OVERFLOW	35.0%	2.491	4.626	7.116	139.7%	50.00%	1.245
24	ORE SLIMES TO TAILINGS	5.0%	0.115	2.177	2.291	6.4%	29.80%	0.034
22	DE-SLIMED ORE TO MAG, SEP.	49.3%	2.376	2.449	4.825	133.3%	50.97%	1.211
23	MAG. SEP. 1 DILUTION WATER	%0:0	0.000	31.600	31.600			•
24	NET FEED TO MAG. SEP. 1	6.5%	2.376	34.049	36.425	133.3%	50.97%	1.211
25	MAG. SEP 1 TAILS	11.9%	0.755	5.592	6.347	42.4%	21.70%	0.164
26	MAG, SEP. 1 CONC.	5.4%	1.621	28.457	30.078	%6.06	64.62%	1.047
27	MAG. SEP. 2 DILUTION WATER	%0:0	0.000	14.300	14.300			-
28	NET FEED TO MAG. SEP. 2	3.7%	1.621	42.757	44.378	%6.06	64.62%	1.047
29	MAG. SEP 2 TAILS	1.5%	0.076	5.002	5.079	4.3%	21.94%	0.017
30	MAG. SEP. 2 CONC.	3.9%	1.545	37.755	39.299	86.6%	66.72%	1.031

D.O.E. IRONMAKING - SHAFT FURNACE, 100% DRI CHARGE (2.5% C) Rev. 2

DOE10025

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE
08-June-2000 IRON ORE CONCENTRATOR (PFD-002)

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Fe UNITS (MM T/YR)						1.031	0.005	1.025	0.000	3.076	1.025	2.051		
%Fe (DRY)			 •	- ,	·,	66.72%	23.83%	67.33%	%00.0	67.33%	67.33%	67.33%		7 .
SOLIDS % OF DRI FD				<u> </u>		86.6%	1.2%	85.4%	170.9%	256.3%	85.4%	170.9%	-	- \
TOTAL (MM T/YR)	13.900				7.11.	53.199	1.442	51.758	4.686	56.444	51.758	4.686	0.000	5.100
LIQUID (MM T/YR)	13.900				_	51.655	1.420	50.235	1.640	51.875	50.235	1.640	0.000	5.100
DRY SOLIDS (MM T/YR)	0.000					1.545	0.022	1.523	3.046	4.569	1.523	3.046	0.000	0.000
% SOLIDS	%0:0		 			2.9%	1.5%	2.9%	65.0%	8.1%	2.9%	65.0%	%0.0	%0.0
STREAM LABLE	MAG. SEP. 3 DILUTION WATER					NET FEED TO MAG. SEP. 3	MAG. SEP 3 TAILS	MAG. SEP. 3 CONC.	REGRIND MILL DISCHARGE	NET FEED TO REGRIND MILL CYCLONE	REGRIND MILL CYCLONE O/F PRODUCT TO FLOTATION	REGRIND MILL CYCLONE U/F TO MILL	REGRIND MILL DILUTION WATER	FLOTATION DILUTION WATER
STREAM NUMBER	34					32	33	34	35	36	37	38	36	40

DOE10025 08-June-2000 Revision A: (DOE10025 08-June-2000 (BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE 08-June-2000 (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C) Revision A: ORIRON ORE CONCENTRATOR (PFD-002)	KING WATE URNACE - 1	R & SOLIDS 00% DRI CH	BALANCE IARGE - 2.5%	(5			5 of 13
STREAM	STREAM LABLE	% sorids	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
4	FLOTATION CHEMICALS	0.0%	0.000	0.050	0.050			
42	NET FLOTATION FEED	2.7%	1.523	55.385	56.908	85.4%	67.33%	1.025
43	FLOAT TAILS - Fe CONC. TO MAG. IV	2.7%	1.508	55.343	56.851	84.6%	%29'29	1.020
44	SULFUR FLOAT REJECTS TO TAILS	27.0%	0.015	0.041	0.056	%6:0	33.67%	0.005
45	MAG. SEP. 4 CONC.	2.7%	1.467	52.666	54,133	82.3%	68.56%	1.006
46	MAG. SEP. 4 GANGUE REJECT TO TAILS	1.5%	0.041	2.677	2.718	2.3%	35.69%	0.015
47	CONCENTRATE TO PIPELINE FEED	65.0%	1.467	0.790	2.257	82.3%	68.56%	1.006
48	EXCESS WATER FROM CONC. THICK. TO P.W. POND	%0.0	0.000	51.876	51.876			·
49	TOTAL REJECTS TO TAILS	2.7%	1.024	16.909	17.933	57.4%	23.40%	0.240
50	DEWATERED TAILINGS TO DISPOSAL	35.0%	1.024	1.901	2.925	57.4%	23.40%	0.240
51	TAILS THICKENER DECANT TO P.W. POND	%0:0	0.000	15.008	15.008			
52	EXCESS WATER FROM TAILS POND	0.0%	0.000	1.389	1.389			
53	FRESH WATER MAKEUP TO P.W. POND	%0.0	0.000	5.232	5.232			
54	EVAPORATION FROM P.W. POND	0.0%	0.000	3.675	3.675			
	TOTAL INPUTS TO P.W. POND	0.0%	0.000	73.506	73.506			
55	TOTAL CONCENTRATOR WATER INPUTS	%0.0	0.000	79.900	79.900			

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

08-June-2000 (BASE CASE: MIDF Revision A: ORPIPELINE & ORE RECEIVING (PFD-003)

DOE10025

STREAM	STREAM LABLE	SOLIDS %	DRY SOLIDS	LIQUID	TOTAL	% SOLIDS	%Fe	Fe UNITS
			(WIM L/TR)	(IMIM I/YK)	(MM I/YR)	OF DRI FD	(DRY)	(MM T/YR)
43	CONCENTRATE SLURRY FROM PIPELINE	65.0%	1.467	0.790	2.257	82.3%	68.56%	1.006
101	CONCENTRATE FEED TO DEWATERING	%0.59	1.467	0.790	2.257	82.3%	68.56%	1.006
102	NET FILTER FEED	%0.09	2.101	1.400	3.501	117.8%	70.36%	1.478
103	FEED SLURRY DIVERSION TO THICKENERS	65.0%	0.000	0.000	00000	0.0%	68.56%	0.000
104	FILTER CAKE	92.0%	1.890	0.164	2.055	106.0%	70.36%	1.330
105	FILTRATE	%0.0	0.000	1.096	1.096	 		
106	FILTER O/F	60.0%	0.210	0.140	0.350	11.8%	70.36%	0.148
107	LAUNDER WASH-DOWN WATER	%0'0	0.000	0.700	0.700		,	
108	NET FILTER O/F RETURN	20.0%	0.210	0.840	1.050	11.8%	70.36%	0.148
109	THICKENER FEED	9:09	2.101	2.054	4.154	117.8%	70.36%	1.478
110	THICKENER DECANT	%0.0	0.000	0.653	0.653	· · · · =		
+	THICKENER U/F	%0.09	2.101	1.400	3.501	117.8%	70.36%	1.478
112	EXCESS WATER TO PROCESS WATER	0.0%	0.000	1.749	1.749	·		

D.O.E. IRONMAKING - SHAFT FURNACE, 100% DRI CHARGE (2.5% C) Rev. 2

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

08-June-2000

DOE10025

Revision A:	Revision A: ORSTOCKPILE, PELLET PLANT SLURRY/FINES HANDLING (BFD-004)	(BFD-004)	adi IOa yad	41101	44.04)	- H / O	() L
NUMBER		/8 SOLIDS	(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	%re (DRY)	(MM T/YR)
201	RECYCLE EAF DUST SLURRY	15.0%	0.020	0.112	0.132	1.1%	48.50%	0.010
202	RECYCLE DRI DUST SLURRY	15.0%	0.169	0.957	1.125	9.5%	86.13%	0.145
203	P.P. DUST/FINES SLURRY	15.0%	0.123	0.698	0.821	%6.9	67.64%	0.083
204	P.P. DUST SYSTEMS O.S.	%0:08	0.047	0.012	0.059	2.6%	67.64%	0.032
205	FEED TO P.P. THICKENER	18.5%	0.423	1.861	2.284	23.8%	76.61%	0.324
206	DECANT FROM P.P. THICKENER	0.0%	0.000	1.437	1.437			
207	U/F FROM P.P. THICKENER TO FEED THICK.	50.0%	0.423	0.423	0.847	23.8%	76.61%	0.324
208	DRI CLASSIFIER O/S	75.0%	0.057	0.019	0.075	3.2%	86.39%	0.049
209	-6 mm ORE/PELLET FINES	100.0%	0.055	0.000	0.055	3.1%	67.64%	0.037
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	67.64%	0.000
211	TOTAL FEED TO MILLING	83.8%	0.159	0.031	0.189	8.9%	74.31%	0.118
212	MILL MAKE-UP WATER	%0:0	0.000	0.075	0.075	%0:0		
213	GROUND FINES SLURRY TO P.P. THICKENER	%0.09	0.159	0.106	0.265	8.9%	74.31%	0.118
232	INDURATED PELLETS TO STOCKPILE	100.0%	1.838	0.000	1.838	103.1%	67.64%	1.243
250	RECLAIMED PELLETS	100.0%	1.838	0.000	1.838	103.1%	67.64%	1.243
251	LUMP ORE3 TO STOCKPILE	%0.78	0.000	0.000	0.000	%0.0	%00.0	0.000
252	RECLAIMED LUMP ORE	%0'.26	0.000	0.000	0.000	%0.0	0.00%	0.000
253	PELLET/LUMP ORE TO FEED SILOS	100.0%	1.838	00000	1.838	103.1%	67.64%	1.243
254	EXCESS PELLETS TO SALES	0.0%	0.000	0.000	0.000	%0.0	67.64%	0.000
		1						

DOE10025

08-June-2000

(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

Revision A: ORGREEN BALL PELLET PRODUCTION: (BFD-005)

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STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	LIQUID	TOTAL	% SOLIDS	%Fe	Fe UNITS
NOMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
104	FILTER CAKE TO PELLET PLANT	92.0%	1.890	0.164	2.055	106.0%	70.36%	1.330
218	NET OXIDE FEED TO PELLETIZING	91.9%	1.971	0.173	2.144	110.6%	70.29%	1.386
219	PELLETIZING WATER	0.0%	0.000	0.027	0.027	%0.0	- 1	
220	COKE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0	_	
221	BINDER TO PELLETIZING	100.0%	0.012	0.000	0.012	%2.0	11.60%	0.001
222	DOLOMITE TO PELLETIZING	100.0%	0.040	0.000	0.040	2.3%	1.61%	0.001
223	LIMESTONE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0	·.	
224	HYDRATED LIME TO PELLETIZING	100.0%	0.000	0.000	0.000	0.0%		
225	PELLET FEED MIXTURE	91.0%	2.023	0.200	2.224	113.5%	68.58%	1.388
226	DISC DRESSING MOISTURE	%0.0	0.000	0.012	0.012	%0.0		
227	GREEN BALL PELLETS	%9.06	2.023	0.212	2.236	113.5%	68.58%	1.388
228	COMBINED GREEN BALL O/S & U/S	80.5%	0.081	0.008	0.089	4.5%	68.58%	0.056
229	SIZED GREEN BALL PELLETS	90.5%	1.943	0.204	2.146	109.0%	68.58%	1.332
				_				_

DOE10025
08-June-2000
(BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)
Revision A: ORINDURATED PELLET PRODUCTION: (BFD-006)

STREAM	STREAM LABLE	SCIIDS %	DRY SOLIDS	LIQUID	TOTAL	SOLIDS %	%Fe	Fe UNITS
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
229	SIZED GREEN BALL PELLETS	90.5%	1.943	0.204	2.146	109.0%	68.58%	1.332
230	INDURATED PELLETS (GROSS)	100.0%	1.970	0.000	1.970	110.5%	67.64%	1.332
231	INDURATED PELLETS (NET)	100.0%	1.838	0.000	1.838	103.1%	67.64%	1.243
232	CRUSHED OVERSIZE PELLETS	100.0%	0.000	0.000	0.000	0.0%	67.64%	0.000
233	UNDERSIZE INDURATED PELLETS	100.0%	0.000	0.000	0.000	0.0%	67.64%	0.000
234	RECYCLED INDURATED PELLET DUST/FINES	100.0%	0.132	0.000	0.132	7.4%	67.64%	0.089
235	P.P. DUST SLURRY WATER	%0.0	0.000	0.698	0.698			
203	P.P. DUST SLURRY TO PELLET FEED	15.0%	0.123	0.698	0.821	6.9%	67.64%	0.089
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	67.64%	0.000

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)

08-June-2000

DOE10025

Revision A:	Revision A: ORDRI SYSTEMS, 1 OF 2 (PFD-007)							
STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (T/HR)
253	RECLAIMED PELLETS/LUMP ORE	100.0%	1.8378	0.0000	1.8378	103.1%	67.64%	1.2430
500	-6 mm OXIDE TO PELLETIZING (ORE/PELLETS)	100.0%	0.0551	0.0000	0.0551	3.1%	67.64%	0.0373
299	REMET (OTHER) CHARGED TO SHAFT FCE.	100.0%	0.0000	0.0000	0.0000	%0.0	67.64%	0.0000
300	NET ORE/PELLETS, ETC. TO SHAFT FCE.	100.0%	1.7826	0.0000	1.7826	100.0%	67.64%	1.2057
301	COATING LIME	100.0%	0.0095	0.0000	0.0095	0.5%		
302	LIME COATING WATER	%0:0	0.0000	0.0284	0.0284	%0.0		
303	NET FURNACE FEED	98.4%	1.7921	0.0284	1.8205	100.5%	67.28%	1.2057
304	OFF-GASSES (INCL. DUSTAWV)	24.5%	0.1661	0.5127	0.6788	9.3%	86.39%	0.1435
305	GAS QUENCH SCRUB WATER (MM TPY)	%0.0	0.0000	73.6065	73.6065	%0.0		
306	FURNACE DUST TO DUST SCRUBBERS	100.0%	0.0302	0.0000	0.0300	1.7%	86.39%	0.0259
307	FURNACE DUST SCRUB WATER	%0.0	0.0000	2.3448	2.3448	0.0%	· -	
308	FCE DUST SLURRY TO CLASSIFIER	1.3%	0.0300	2.3448	2.3748	1.7%	86.39%	0.0259
309	GAS QUENCH SCRUBBER BLOWDOWN	%9'9	0.1661	2.3448	2.5109	9.3%	86.39%	0.1435
208	COARSE SOLIDS FROM CLASSIFIER	75.0%	0.0565	0.0188	0.0754	3.2%	86.39%	0.0488
310	DE-GRITTED FCE. SCRUB BLOW-DOWN	%0'.26	0.1396	4.6707	4.8103	7.8%	86.39%	0.1206
311	PRODUCT SILO SCRUBBER BLOW-DOWN	0.4%	0.0062	1.6079	1.6140	0.3%	91.39%	0.0056
312	OXIDE SCREEN SCRUBBER BLOW-DOWN	100.0%	0.0080	1.6079	1.6159	0.5%	67.64%	0.0054
313	COMPRESSOR COOLING WATER	%0.0	0.0000	6.6994	6.6994	%0.0		
314	PRODUCT SCREEN SCRUBBER	%9:0	0.0150	2.3448	2.3598	0.8%	91.39%	0.0137
315	NET CLARIFIER FEED	0.5%	0.1688	91.0498	91.2186	9.5%	86.13%	0.1454

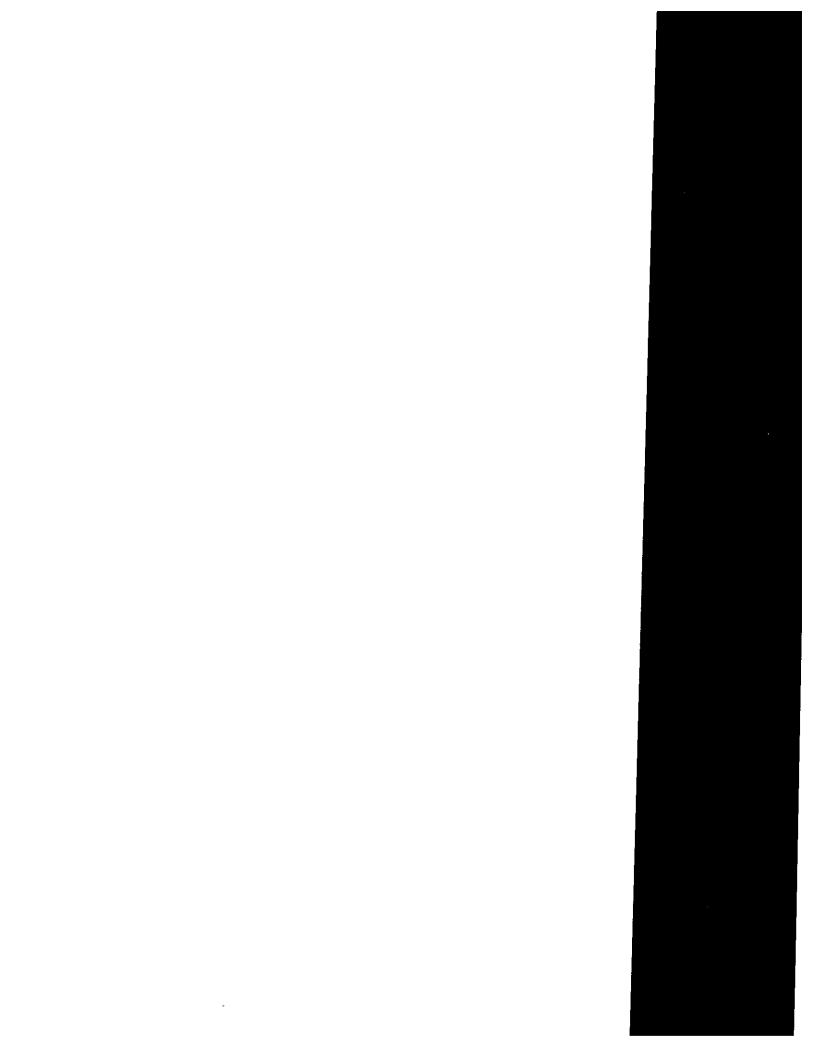
D.O.E. IRONMAKING - SHAFT FURNACE, 100% DRI CHARGE (2.5% C) Rev. 2

DOE10025 BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE 08-June-2000 (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C)
Revision A: ORDRI SYSTEMS, 2 OF 2 (PFD-008)

STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	CIOOID	TOTAL	% SOI TOS	%Fe	FeliNiTC
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
316	CLAR, DECANT TO COOLING SYSTEMS	%0.0%	0.0000	80.093	90.093	%0:0		
317	DRI TO SCREENS	100.0%	1.1067	0.000	1.107	62.1%	91.39%	1.0114
318	DRI WITH FINES REMOVED	100.0%	1.0624	0.000	1.062	59.6%	91.39%	0.9710
319	DRI FROM SILOS	100.0%	1.0624	0.000	1.062	%9.69	91.39%	0.9710
320	EXCESS DRI TO SALES	100.0%	0.0000	0.000	0000	%0.0	91.39%	0.0000
321	DRI TO EAF STORAGE HOPPERS	100.0%	1.0624	0.000	1.062	29.6%	91.39%	0.9710
322	GAS QUENCH O/F WATER TO CLARIFIER	%0.0	0.0000	74.119	74.119	%0.0		
323	INERT GAS (MM Nm3/YR)	%0.0	0.0000	43.000	43.000	0.0%		
324	DRI SCREEN FINES TO EAF INJECTION	100.0%	0.0443	0.000	0.044	2.5%	91.39%	0.0405

12 of	Fe UNITS (MM T/YR)		0.013		0.048	0.016 0.065 0.013		0.041	1.052	
-	%Fe (DRY)	91.39%	40.72%		99.70%	99.70% 43.80%		25.60% 48.50%	99.70%	
PERATION % OF SLAB		62.1%	0.0% 1.8% 3.0%	0.5%	2.7%	3.6%	0.0%	_	0.0%	0.0%
OLIDS BALANCE RI CHARGE - 2.5% C) 8,000 HRSYYR EAFILMFICASTING OPERATION TOTAL ROPE 100110 TOTAL % OF		0.013	0.007	70.627	0.048	0.065	70.627	0.020	10 10 E	0.063
BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE NG/LMF (PFD-009) STREAM LABLE BASIS: BASIS: 8,000 HRS/YR EAFLMF/C NG/LMF (MM TYR) MM	0.000	0.000	0.000	70.627	0.000	0.000	70.627	0.000 19.250 1.055	3.0	
TER & SOLIDS - 100% DRI CH IS: 8000 S DRY SOLIDS (MM TYR)	1.107	0.013	0.007	0.000	0.016	0.030	0.000		0.0004 0.0000	
ET FURNACE - BASIS:	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	0.0%		100.0% 0.00 100.0% 0.00 0.0% 0.00	
E IRON/STEEI			NM3/YR)			M NM3/YR)				% C) Rev. 2
BASE CASE ASE CASE: '/LMF (PFD-009) STREAM LABLE	EAF	-eMn, FeSi, etc.)	EAF ELECTRODES TOTAL EAF COOLING WATER CIRC. (MM NIM3/YR)		CHARGED	PROCESS/COOLING WATER OUT OF EAF (MM NM3/YR)	LECTION IM Nm3/YR)	EFINING EF. FCE.	RF ()	N CHARGE (2.5
BA (BASE (BASE (BASE STRE STRE TOTAL DRI FEED TO EAF	SILICA FLUX TO EAF	MISC. ADDITIVES (AI, FeMn, FeSi, etc.) STEEL CARRON (A.)	EAF ELECTRODES FOTAL EAF COOLING W	PURCHASED SCRAP	TOTAL FLUX & ADDITIVES CHARGED	PROCESS/COOLING WATER OU AF SLAG (LIQUID)	EAF DUST TO EAF DUST COLLECTION OXYGEN GAS TO FURNACE (MM Nm3/YR)	LIQUID EAF STEEL TO LADLE REFINING PULVERIZED LIME TO LADLE REF. FCE.	ULFURIZER TO, LRF (MM Nm3/YF	
RASE CAS Revision A: OREAF STEELMAKING/LMF (PFD-009) NUMBER 400 TOTAL DRI FEED TO EAF	402 SILIC,	403 MISC. 404 STEEL	405 EAF ELECTROL 406 TOTAL EAF COC 407 REVERT SCRAP			PROCESS/COOLIN EAF SLAG (LIQUID)	EAF DUST TC OXYGEN GAS	LIQUID EAF ST PULVERIZED LII SLAGAMIEC ET	419 ARGON GAS TO LRF (MM Nm3/YR) D.O.E. IRONMAKING - SHAFT FURNACE, 100% DB1 2	
88 % X			4	408	410	412	414 415		D.O.E. IRONMAK	

DOE10025 08-June-2000 Revision A: C	DOE10025 08-June-2000 (BASE CASE: MIDREX SHAFT FURNACE - 100% DRI CHARGE - 2.5% C) Revision A: OREAF STLMAKING/LMF (PFD-009), CASTING (PFD-010) BASIS: 0 (MM T/YR)	URNACE - 1 BASIS:	00% DRI CH	IARGE - 2.5% (MM T/YR)	රි				
STREAM	STREAM LABLE	SOIIDS %	DRY SOLIDS (MM T/YR)	LIQUID (MIM T/YR)	TOTAL (MM T/YR)	% OF SLAB OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)	
420	SLAG & LOSSES FROM LRF	%0.0	0.000	0.007	0.007	%0.0	31.80%	0.002	
421	REFINED STEEL TO CASTING	%0.0	0.000	1.053	1.053	%0.0	89.70%	1.050	
422	PULVERIZED LIME FLUX TO EAF	100.0%	0.043	0.000	0.012	0.7%			
423	WATER FOR EAF DUST TRANSPORT	%0.0	0.000	0.112	0.112	%0:0			
424	PROC. COOLING WATER LMF	%0.0	0.000	14.125	14,125	%0:0			
425	TOTAL SLAG OUTPUT (AS SOLID)	100.0%	0.159	0.000	0.159	8.9%	26.95%	0.043	
501	SLAB SCALE	%0.0	0.005	0.000	0.005	0.3%	80.00%	0.004	
502	LADLE SCRAP	%0.0	0.024	0.000	0.024	1.3%	99.70%	0.024	
503	TUNDISH SCRAP	100.0%	900.0	0.000	900.0	0.4%	99.70%	0.006	
504	CROP END SCRAP	%0.0	0.018	0.000	0.018	1.0%	99.70%	0.018	
505	MOLD POWDER TO CASTING	100.0%	0.0006	0.000	0.001	4.8%	· •		
909	TUNDISH POWDER TO CASTING	100.0%	0.0003	0.000	0.000	1.5%			
205	MOLD COOLING WATER (MM NM3/YR)	%0.0	0.000	29.206	29.206	%0.0			
508	CONTACT COOLING WATER (MM NM3/YR)	%0:0	0.164	9.600	9.764	9.5%			
909	NET STEEL TO CASTING	0.0%	0.000	1.000	1.000	0.0%	89.70%	0.997	
510	TOTAL CAST SLAB PRODUCT	100.0%	0.977	0.000	0.977	54.8%	%02.66	0.975	
511	THIN SLAB TO HOT BAND	#DIV/0i	0.000	0.000	0.000	%0.0	%02.66	0.000	
512	SLABS TO SALES	100.0%	0.977	0.000	0.977	54.8%	89.70%	0.975	
513	HOT BAND TO SALES	100.0%	0.000	0.000	0.000	0.0%	89.70%	0.000	



APPENDIX D-3 30% DRI CHARGED TO EAF - 1.0% CARBON

IMSDRI30 16-Sept-1999 (MIDREX SHAFT FURNACE - 30% DRI CHARGE) Revision A: OREBODY ASSUMPTIONS

	BASIS:		NO!
TOTA! PIA	TOTAL PLANT PROPILICATION (NEW BASIS).	6,000 HKS/YK EAF/LMF/CASTING OPERATION	
2.087	MM TONNES/YEAR AS-MINED ROCK	61.2 T/HB ORE1 CONC NET EEED 69 E529/	
0.825	MM TONNES/YEAR NET ORE TO CONCENTRATOR	-	INON UNITS IN CONC. 68.560%
0.486	MM TONNES/YEAR NET CONCENTRATE	T/HR ORE3	RON UNITS
0.000	MM TONNES/YEAR LUMP ORE3	RI ORE FEED	IRON UNITS 89.36% AS EE204
0.830	MM TONNES/YEAR GREEN BALL PELLET (+6mm)		10 64%
0.841	MM TONNES/YEAR TOTAL INDURATED PELLET		9/10/20
0.785	MM TONNES/YEAR NET INDURATED PELLET (+6mm)	0.367 DRI PROD. 2.072 ORE/P TO DRI	Fe RECOV
0.761	MM TONNES/YEAR FEED TO DRI FCE.	0.977 SLAB PROD. 0.376 DRI TO SLAB	Wt.% RECOV
0.367	MIM TONNES/YEAR DRI	CONCENTRATOR DEWATERING	1,0,1
0.977	MM TONNES/YEAR NET SLAB PRODUCT (BALANCE)	65.0% WT.% SOLIDS IN CONC. THICK, U/F	1.014 RATIO INDUR./G.B. PELLET
0.000	MM TONNES/YEAR HOT BAND SLAB	35.0% WT.% SOLIDS IN TAILS. THICK. U/F	
0.977	MM TONNES/YEAR NET SLAB PRODUCT	0.0% FEED DIVER. TO THICK % OF FEED	2.0% EAF DUST - WT. % OF SLAB
1.000	MM TONNES/YEAR LIQUID STEEL (TARGET)	10.0% FILTER FEED O/F - % OF FEED	
0.977	MM TONNES/YEAR NET SLAB PRODUCT (TARGET)	DRI PLANT	
	CONCENTRATOR	3.0% PERCENT OF PELLET FINES - WT.% PEL.	
60.474%	WASTE ROCK - % OF MINED	10.0% PERCENT OF LUMP FINES - WT.% LUMP	
3.000%	AS-MINED ROCK MOISTURE - %	4.0% PERCENT DUST - WT.% OF OXIDE FEED	-
30.000%	AS-MINED ROCK IRON UNITS - WT.% IRON	3.0% PERCENT -6 mm DRI FINES - WT.% DRI	
20.000%	ORE ROCK IRON UNITS - WT.% IRON	0.0% PERCENT REMET CHARGED - WT % OF FD	
%0.07	GRIZZLY SCREEN O/S - % OF FEED	0.22% PERC, LIME FOR COATING - WT.% OF FD	
200.0%	CIRCULATING LOAD - +10 mm TO TERTIARY (% FEED)	21.83% SOLIDS IN OFF-GASS - WT.% OF DRI FD	
%0.0	PERCENT FEED TO SECONDARY 2 (%)		
%0.0	PERCENT FEED TO TERTIARY 4 (%)		
300.0%	BALL MILL CIRCULATING LOAD (% OF FEED)	1.68% SOLIDS IN SILO DUST - % OF DRI PROD	
65.0%	BALL MILL PERCENT SOLIDS (% OF FEED)		
35.0%	B.M. CYCLONE O/F PERCENT SOLIDS (%)		
4.60%	GROUND ORE LOSSES TO SLIMES - WT.%	93.00% METALLIZATION - WT.% Fet IN DRI	
2.00%	DESLIME CYCLONE O/F PERCENT SOLIDS (%)	PELLET PLANT	
68.21%	STG.1 MAG. CONC. RECOVERY - WT.% OF FEED	6.7% PERCENT DUST/FINES - WT.% OF G.B.	
86.39%	STG. 1 IRON UNIT RECOVERY - WT.% OF IRON UNITS		
95.30%	STG. 2 MAG. CONC. WT. RECOVERY - WT.% OF FEED		0.04% SLG TO LMF - % M. STL
88.50%	STG. 2 MAG. CONC. IRON UNIT RECOV WT.% OF IU		0.64% SLG FR. LMF - %MS
98.60%	STG. 3 MAG. CONC. RECOV WT.% OF FEED		0.060 ARGON TO LMF - NM3/T MS
99.50%	STG. 3 MAG. CONC. IRON UNIT RECOV WT.% OF IU		0.50% SLAB SCALE - %MS
200.00%	REGRIND MILL CIRCULATING LOAD (% OF FEED)		0.06% MOLD POWDER - % M. STL.
65.00%	REGRIND MILL % SOLIDS (WT.%)		0.03% TUND. POWDER - % M. STL.
%00.66	S-FLOTATION IRON CONC - WT.% OF FEED		100.00% SLAB PROD % OF PROD.
99.50%	S-FLOTATION IRON UNIT RECOV WT.% OF IU		0.27% SLAG C INJ WT% M. STL
92.30%	GAN. REJECT. MAG. SEP WT.% OF FEED		25.60% %Fe IN EAF SLAG
98.57%	IQ	0.0% EXCESS PELLETS TO SALES - % OF TOTAL	
RED = ASSUI	RED = ASSUMPTION INPUT (DATA OR EXPERIENCE)	BLUE = DERIVED VARIABLE	
	Control of the Contro		

D.O.E. IRONMAKING - 30% SHAFT FCE DRI, 1.0 WT.% CARBON, Rev. 2

IMSDRI30

16-Sept-1999

(MIDREX SHAFT FURNACE - 30% DRI CHARGE)

Revision A: ORIRON ORE CONCENTRATOR (PFD-002)

STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	Lionid	TOTA!	% SQL 108	-24/8	<u> </u>
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
1001	AS-MINED ROCK	%0'.26	2.087	0.065	2.152	274.2%	30.00%	0.626
1002	WASTE ROCK	%0'.26	1.262	0.039	1.301	165.8%		
~	IRON ORE TO CONCENTRATOR (CRUSHING)	%0'.26	0.825	0.026	0.851	108.4%		
7	PRODUCT FROM PRIMARY CRUSHER (80% -130 mm)	%0'.26	0.825	0.026	0.851	108.4%		
m	FEED TO GRIZZLY (Secondary 1)	%0'.26	0.825	0.026	0.851	108.4%		
e m	FEED TO GRIZZLY (Secondary 2)	%0'.26	0.000	0.000	0.000	%0:0		
4	OS FROM GRIZZLY (Secondary 1)	%0'.26	0.578	0.018	0.595	75.9%	20.00%	
4	OS FROM GRIZZLY (Secondary 2)	97.0%	0.000	0.000	0.000	0.0%	20.00%	0.000
ιO	US FROM GRIZZLY (Secondary 1)	92.0%	0.248	0.008	0.255	32.5%	\$0.00%	0.124
e G	US FROM GRIZZLY (Secondary 2)	%0'.26	0.000	0.000	0.000	%0.0	20.00%	0.000
ဖ	US FROM SECONDARY 1 (80% -37 mm)	%0′26	0.578	0.018	0.595	75.9%	20.00%	0.289
6 8	US FROM SECONDARY 2 (80% -37 mm)	%0'.26	00000	0.000	0.000	0.0%	20.00%	0.000
7	TOTAL FEED TO TERTIARY CRUSHERS (+10 mm)	%0'.26	1.650	0.051	1.701	216.8%	20.00%	0.825
7 a	US FROM TERTIARY 1 (80% -10 mm)	80'26	0.550	0.017	0.567	72.3%	20.00%	0.275
7 b	US FROM TERTIARY 2 (80% -10 mm)	%0.76	0.550	0.017	0.567	72.3%	20.00%	0.275
7 c	US FROM TERTIARY 3 (80% -10 mm)	%0.76	0.550	0.017	0.567	72.3%	20.00%	0.275
7 d	US FROM TERTIARY 4 (80% -10 mm)	%0.76	0.000	0.000	0.000	%0.0	20.00%	0.000
80	TOTAL FEED TO TERTIARY SCREENS	92.0%	2.475	0.077	2.552	325.2%	50.00%	1.238
6	UNDERSIZE FROM TERTIARY SCREENS (-10 mm)	97.0%	0.825	0.026	0.851	108.4%	20.00%	0.413
10	TOTAL FEED TO BALL MILLS (-10 mm)	%0.78	0.825	0.026	0.851	108.4%	\$0.00%	0.413
					_	_		

D.O.E. IRONMAKING - 30% SHAFT FCE DRI, 1.0 WT.% CARBON, Rev. 2

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE

W. SOLIDS DRY SOLIDS LIQUID TOTAL SOLIDS W SOLIDS	IMSDRI30 16-Sept-1999	BASE CASE IRON/STEE	KING WATE	LMAKING WATER & SOLIDS BALANCE	BALANCE				3 of 13
97.0% 0.413 0.013 0.425 54.2% 50.00% 97.0% 0.413 0.013 0.425 54.2% 50.00% 97.0% 0.413 0.013 0.425 54.2% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 95.0% 2.063 1.111 3.17 27.1% 50.00% 95.0% 0.000 14.350 14.360 103.4% 50.00% 95.0% 0.000 1.852 2.163 21.43% 11.9% 0.000 31.600 31.066 70.5% 64.74%	STREAM	STREAM LABLE	SOLIDS %	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS
97.0% 0.413 0.013 0.425 54.2% 50.00% 97.0% 0.406 0.013 0.425 54.2% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 14.350 14.350 162.6% 50.00% 97.0% 0.000 14.350 14.350 14.350 162.6% 50.00% 98.0% 0.000 14.350 14.350 10.34% 50.90% 98.0% 0.000 31.600 31.600 70.5% 64.74% 98.0% 0.000 14.300 14.300 70.5% 64.74% 98.0% 0.000 14.300 <	10 a		%0'.26		0.013	0.425	54.2%	20.00%	0.206
97.0% 0.413 0.013 0.425 54.2% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 14.950 15.76 162.6% 50.00% 97.0% 0.000 14.950 14.950 16.26% 50.00% 90.0% 0.000 14.950 16.36 50.00% 50.00% 90.0% 0.000 31.600 31.600 21.43% 50.97% 11.9% 0.050 31.600 31.006 70.5% 64.74% 1.2% 0.050 14.300 14.300 70.5% 64.74% 1.2% 0.052 1657 43.713	10 b		97.0%		0.013	0.425	54.2%	20.00%	0.206
97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 65.0% 0.206 1.111 3.173 27.1% 50.00% 7.8% 1.238 1.4528 14.566 162.6% 50.00% 0.0% 0.000 14.950 14.950 162.6% 50.00% 5.0% 0.083 0.721 0.759 5.0% 50.00% 49.3% 0.088 0.721 0.759 50.97% 11.9% 0.000 31.600 31.600 70.5% 64.74% 11.9% 0.250 1.852 2.103 70.5% 64.74% 0.0% 0.000 14.300 70.5% 64.74% 1.2% 0.025 1.682 33.9% 21.43% 1.2% 0.035	Ε	TOTAL FEED TO BALL MILLS (-10 mm)	97.0%		0.013	0.425	54.2%	20.00%	0.206
97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 95.0% 2.063 1.111 3.173 27.1% 50.00% 65.0% 2.063 1.4528 15.766 162.6% 50.00% 0.0% 0.000 14.950 14.950 162.6% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.000 31.600 31.600 31.600 50.97% 21.43% 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 1.2% 0.000 14.300 70.5% 64.74% 1.2% 0.0537 44.859 45.396 70.5% 64.	11 a		%0'.0%		900.0	0.213	27.1%	20.00%	0.103
97.0% 0.206 0.006 0.213 27.1% 50.00% 97.0% 0.206 0.006 0.213 27.1% 50.00% 65.0% 2.063 1.111 3.173 271.0% 50.00% 7.8% 1.238 14.528 15.766 162.6% 50.00% 0.0% 0.000 14.950 14.950 50.00% 50.00% 5.0% 0.825 1.532 2.357 108.4% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.081 1.588 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.60 70.5% 64.74% 1.1.9% 0.0537 32.411 33.198 70.5% 64.74% 0.0% 0.000 14.300 14.300 64.74% 1.2% 0.0537 44.859 45.396 70.5% 64.74% 1.2% 0.0526 1.657 43.713 67.2% 67.2%	4 b		%0'.26	0.206	900.0	0.213	27.1%	20.00%	0.103
97.0% 0.206 0.006 0.213 27.1% 50.00% 65.0% 2.063 1.111 3.173 27.1% 50.00% 7.8% 1.238 14.528 15.766 162.6% 50.00% 0.0% 0.000 14.950 14.950 50.00% 50.00% 5.0% 0.032 1.532 2.357 108.4% 50.00% 6.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.787 0.781 1.588 103.4% 50.97% 0.0% 0.000 31.600 31.500 21.43% 50.97% 11.9% 0.250 1.852 2.103 22.9% 51.43% 0.0% 0.000 14.300 14.300 70.5% 64.74% 1.2% 0.0537 44.859 45.396 70.5% 64.74% 1.2% 0.0526 1.657 2.163 2.462% 1.2% 0.0526 1.4300 1.632 2.452% 1.2% </td <td>11 0</td> <td></td> <td>%0'.26</td> <td>0.206</td> <td>900.0</td> <td>0.213</td> <td>27.1%</td> <td>20.00%</td> <td>0.103</td>	11 0		%0'.26	0.206	900.0	0.213	27.1%	20.00%	0.103
65.0% 2.063 1.111 3.173 271.0% 50.00% 7.8% 1.238 14.528 15.766 162.6% 50.00% 0.0% 0.000 14.950 14.950 162.6% 50.00% 35.0% 0.0825 1.532 2.357 108.4% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.600 31.096 70.5% 64.74% 11.9% 0.250 1.852 2.103 32.9% 21.43% 11.9% 0.0537 30.559 31.096 70.5% 64.74% 1.2% 0.0537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 43.713 67.2% 66.72%	<u>1</u>		%0''26	0.206	900:0	0.213	27.1%	20.00%	0.103
7.8% 1.238 14.528 15.766 162.6% 50.00% 0.0% 0.000 14.950 14.950 10.00% 50.00% 35.0% 0.0825 1.532 2.357 108.4% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.09 70.5% 64.74% 1.1.9% 0.0537 30.559 31.096 70.5% 64.74% 1.5% 0.025 1.657 1.682 33.3% 24.62% 1.2% 0.025 1.657 43.202 33.8 67.2% 66.72%	12	TOTAL FEED TO BALL MILL CYCLONES	65.0%	2.063	17.	3.173	271.0%	20.00%	1.031
0.0% 0.000 14.950 14.950 108.4% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.600 50.97% 11.9% 0.787 32.411 33.198 103.4% 50.97% 11.9% 0.250 1.852 2.103 32.9% 21.43% 0.0% 0.000 14.300 14.300 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 33.% 24.62% 1.2% 0.025 1.657 6.72% 65.72%	13	TOTAL B.M. CYCLONE UNDERFLOW	7.8%	1.238	14.528	15.766	162.6%	20.00%	0.619
35.0% 0.825 1.532 2.357 108.4% 50.00% 5.0% 0.038 0.721 0.759 5.0% 29.80% 49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.600 31.60 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 1657 45.396 70.5% 64.74% 1.5% 0.025 1.657 43.202 43.713 67.2% 66.72%	14	TOTAL B.M. MAKEUP WATER	%0.0	0.000	14.950	14.950	····		
5.0% 0.038 0.721 0.789 5.0% 29.80% 49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.600 2.4% 0.787 32.411 33.198 103.4% 50.97% 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 14.300 64.74% 64.74% 1.2% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.025 43.202 43.713 67.2% 66.72%	15	TOTAL B.M. CYCLONE OVERFLOW	35.0%	0.825	1.532	2.357	108.4%	20.00%	0.413
49.3% 0.787 0.811 1.598 103.4% 50.97% 0.0% 0.000 31.600 31.600 31.600 2.4% 0.787 32.411 33.198 103.4% 50.97% 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 1.2% 0.0537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	24	ORE SLIMES TO TAILINGS	5.0%	0.038	0.721	0.759	5.0%	29.80%	0.011
0.0% 0.000 31.600 31.600 31.600 50.97% 11.9% 0.787 32.411 33.198 103.4% 50.97% 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 14.300 70.5% 64.74% 1.2% 0.025 1.657 1.682 33.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	22	DE-SLIMED ORE TO MAG. SEP.	49.3%	0.787	0.811	1.598	103.4%	50.97%	0.401
2.4% 0.787 32.411 33.198 103.4% 50.97% 11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 14.300 70.5% 64.74% 1.2% 0.537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 33.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	23	MAG. SEP. 1 DILUTION WATER	0.0%	0.000	31.600	31.600			
11.9% 0.250 1.852 2.103 32.9% 21.43% 1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 14.300 64.74% 1.2% 0.537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	24	NET FEED TO MAG. SEP. 1	2.4%	0.787	32.411	33.198	103.4%	92.97%	0.401
1.7% 0.537 30.559 31.096 70.5% 64.74% 0.0% 0.000 14.300 14.300 64.74% 1.2% 0.537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	25	MAG. SEP 1 TAILS	11.9%	0.250	1.852	2.103	32.9%	21.43%	0.054
0.0% 0.000 14.300 14.300 1.2% 0.537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	56	MAG. SEP. 1 CONC.	1.7%	0.537	30.559	31.096	70.5%	64.74%	0.348
1.2% 0.537 44.859 45.396 70.5% 64.74% 1.5% 0.025 1.657 1.682 3.3% 24.62% 2 1.2% 0.512 43.202 43.713 67.2% 66.72%	27	MAG. SEP. 2 DILUTION WATER	%0.0	0.000	14.300	14.300			
1.5% 0.025 1.657 1.682 3.3% 24.62% 1.2% 0.512 43.202 43.713 67.2% 66.72%	28	NET FEED TO MAG. SEP. 2	1.2%	0.537	44.859	45.396	70.5%	64.74%	0.348
1.2% 0.512 43.202 43.713 67.2% 66.72%	29	MAG. SEP 2 TAILS	1.5%	0.025	1.657	1.682	3.3%	24.62%	0.006
	30 DOF IRONM	MAG. SEP. 2 CONC. JAKING - 30% SHAFT FCE DRI, 1 0 WT % CARRON, Rev. 2	1.2%	0.512	43.202	43.713	67.2%	66.72%	0.341

IMSDRI30

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE
16-Sept-1999 IRON ORE CONCENTRATOR (PFD-002)

16-Sept-1999 STREAM	IRON ORE CONCENTRATOR (PFD-002) STREAM LABI F	041 00 78	SOURCE COLING SOURCE DALLANCE	DALAINCE				4 of 13
NUMBER		% SOLIDS	URY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS %	%Fe	Fe UNITS
<u></u> স	MAG. SEP. 3 DILUTION WATER	%0.0	0.000	13.900	13.900		(PAS)	(MIM 1/YR)
						1.		
						-		
		···	·		-	-		
32	NET FEED TO MAG. SEP. 3	%6.0	0.512	57.102	57 613	0000		
33	MAG. SEP 3 TAILS	707			2	%7:10	66.72%	0.341
72	0,000	8)00:0	0.470	0.478	%6:0	23.83%	0.002
<u> </u>	MAG. SEP. 3 CONC.	%6.0	0.505	56.631	57.136	%8:99	67.33%	0.340
35	REGRIND MILL DISCHARGE	65.0%	1.009	0.543	1.552	132.6%	0.00%	0000
36	NET FEED TO REGRIND MILL CYCLONE	2.6%	1.514	57.175	58.688	198.8%	%88 29	200 6
37	REGRIND MILL CYCLONE O/F PRODUCT TO FLOTATION	%6.0	0.505	56.631	57.136	96.3%	%25.75	50. 60
38	REGRIND MILL CYCLONE U/F TO MILL	65.0%	1.009	0.543	1.552	132.6%	67.33%	0.040
39	REGRIND MILL DILUTION WATER	%0.0	0.000	0.000	0.000			
40	FLOTATION DILUTION WATER	%0:0	0.000	5.100	5.100			
				_			•	

IMSDRI30

16-Sept-1999

(MIDREX SHAFT FURNACE - 30% DRI CHARGE)

Revision A: ORIRON ORE CONCENTRATOR (PFD-002)

STREAM	STREAM LABLE	% sorids	DRY SOLIDS	GINOLI	TOTAL	% 3CI 10'S	0/ 52	T. 1
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM TVP)
4	FLOTATION CHEMICALS	%0.0	0.000	0.050	0.050			
42	NET FLOTATION FEED	0.8%	0.505	61.781	62.286	66.3%	67.33%	0.340
43	FLOAT TAILS - Fe CONC. TO MAG. IV	%8'0	0.499	61.768	62.267	65.6%	67.67%	0.338
44	SULFUR FLOAT REJECTS TO TAILS	27.0%	0.005	0.014	0.019	0.7%	33.66%	0.002
45	MAG. SEP, 4 CONC.	%8'0	0.486	60.881	61.367	63.8%	68.56%	0.333
46	MAG. SEP. 4 GANGUE REJECT TO TAILS	1.5%	0.014	0.887	0.900	1.8%	35.69%	0.005
47	CONCENTRATE TO PIPELINE FEED	65.0%	0.486	0.262	0.748	63.8%	68.56%	0.333
48	EXCESS WATER FROM CONC. THICK, TO P.W. POND	%0.0	0.000	60.619	60.619			
49	TOTAL REJECTS TO TAILS	5.7%	0.339	5.601	5.941	44.5%	23.41%	0.079
50	DEWATERED TAILINGS TO DISPOSAL	35.0%	0.339	0.630	0.969	44.5%	23.41%	0.079
5	TAILS THICKENER DECANT TO P.W. POND	0.0%	0.000	4.972	4.972			···
52	EXCESS WATER FROM TAILS POND	%0.0	0.000	0.460	0.460			
53	FRESH WATER MAKEUP TO P.W. POND	%0.0	0.000	5.232	5.232	-	_	
54	EVAPORATION FROM P.W. POND	%0:0	0.000	3.564	3.564		· · · · · · · · · · · · · · · · · · ·	
	TOTAL INPUTS TO P.W. POND	%0.0	00000	71.283	71.283		·	
55	TOTAL CONCENTRATOR WATER INPUTS	%0'0	0.000	79.900	79.900			

IMSDRi30 16-Sept-1999 Revision A:	BASE CASE IRON/STE (MIDREX SHAFT FURNACE) ORPIPELINE & ORE RECEIVING (PFD-003)	LMAKING WATER & - 30% DRI CHARGE)	ELMAKING WATER & SOLIDS BALANCE E - 30% DRI CHARGE)	BALANCE				6 of 13
STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
43	CONCENTRATE SLURRY FROM PIPELINE	65.0%	0.486	0.262	0.748	63.8%	68.56%	0.333
101	CONCENTRATE FEED TO DEWATERING	65.0%	0.486	0.262	0.748	63.8%	68.56%	0.333
102	NET FILTER FEED	%0.09	0.897	0.598	1.495	117.8%	73.60%	0.660
103	FEED SLURRY DIVERSION TO THICKENERS	65.0%	0.000	0.000	0.000	%0.0	68.56%	0.000
104	FILTER CAKE	92.0%	0.807	0.070	0.877	106.0%	73.60%	0.594
105	FILTRATE	%0.0	0.000	0.468	0.468	****		
106	FILTER O/F	%0.09	060:0	090.0	0.149	11.8%	73.60%	0.066
107	LAUNDER WASH-DOWN WATER	%0.0	0.000	0.299	0.299		·	
108	NET FILTER O/F RETURN	20.0%	0.090	0.359	0.448	11.8%	73.60%	0.066
109	THICKENER FEED	48.8%	0.897	0.942	1.839	117.8%	73.60%	0.660
110	THICKENER DECANT	%0:0	0.000	0.344	0.344			
111	THICKENER U/F	%0.09	0.897	0.598	1.495	117.8%	73.60%	0.660
112	EXCESS WATER TO PROCESS WATER	%0:0	0.000	0.812	0.812			

0.010

48.50%

Fe UNITS (MM T/YR)

%Fe (DRY)

0.148

87.61%

0.037

70.74%

0.033

70.74%

0.261

81.23%

0.261

81.23%

0.050

87.80%

0.017

70.74%

0.000

70.74%

0.100

78.32%

0.100

78.32%

0.555

70.74%

0.555

70.74%

0.000

%00.0

0.000

0.00%

0.555

70.74%

0.000

70.74%

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BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (MIDREX SHAFT FURNACE - 30% DRI CHARGE)

16-Sept-1999 IMSDR130

Revision A:	Revision A: ORSTOCKPILE, PELLET PLANT SLURRY/FINES HANDLING (BFD-004)	(BFD-004)					
STREAM NUMBER	STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	
201	RECYCLE EAF DUST SLURRY	15.0%	0.020	0.112	0.132	2.6%	
202	RECYCLE DRI DUST SLURRY	15.0%	0.169	0.957	1.125	22.2%	
203	P.P. DUST/FINES SLURRY	15.0%	0.053	0.298	0.351	6.9%	
204	P.P. DUST SYSTEMS O.S.	80.0%	0.047	0.012	0.059	6.2%	
205	FEED TO P.P. THICKENER	18.2%	0.321	1.440	1.761	42.2%	
206	DECANT FROM P.P. THICKENER	%0:0	0.000	1.119	1.119		
207	U/F FROM P.P. THICKENER TO FEED THICK.	\$0.0%	0.321	0.321	0.643	42.2%	
208	DRI CLASSIFIER O/S	75.0%	0.057	0.019	0.075	7.4%	
209	-6 mm ORE/PELLET FINES	100.0%	0.024	0.000	0.024	3.1%	
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	
211	TOTAL FEED TO MILLING	80.6%	0.127	0.031	0.158	16.7%	
212	MILL MAKE-UP WATER	%0.0	0.000	0.054	0.054	%0.0	
213	GROUND FINES SLURRY TO P.P. THICKENER	%0.09	0.127	0.085	0.212	16.7%	
232	INDURATED PELLETS TO STOCKPILE	100.0%	0.785	0.000	0.785	103.1%	
250	RECLAIMED PELLETS	100.0%	0.785	0.000	0.785	103.1%	
251	LUMP ORE3 TO STOCKPILE	%0'.26	0.000	0.000	0.000	0.0%	
252	RECLAIMED LUMP ORE	%0'.26	0.000	0.000	0.000	%0.0	
253	PELLET/LUMP ORE TO FEED SILOS	100.0%	0.785	0.000	0.785	103.1%	
254	EXCESS PELLETS TO SALES	%0.0	0.000	0.000	0.000	%0.0	

IMSDRI30

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE
16-Sept-1999

Revision A: ORGREEN BALL PELLET PRODUCTION: (BFD-005)

8 of 13

STREAM NUMBER	STREAM LABLE	% sorids	DRY SOLIDS	LIQUID (MM T/VR)	TOTAL	SOLIDS %	%Fe	Fe UNITS
104	FILTER CAKE TO PELLET PLANT	92.0%	1.	0.070	0.877	106.0%	73.60%	(WIN L/YK)
218	NET OXIDE FEED TO PELLETIZING	91.9%	0.842	0.074	0.916	110.6%	73.53%	
219	PELLETIZING WATER	%0.0	0.000	0.012	0.012	%0.0		•
220	COKE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0		
221	BINDER TO PELLETIZING	100.0%	0.005	0.000	0.005	0.7%	11.60%	0.001
222	DOLOMITE TO PELLETIZING	100.0%	0.017	0.000	0.017	2.3%	1.61%	0.000
223	LIMESTONE TO PELLETIZING	100.0%	0.000	0.000	0.000	0.0%		
224	HYDRATED LIME TO PELLETIZING	100.0%	0.000	0.000	0.000	0.0%		
225	PELLET FEED MIXTURE	91.0%	0.864	0.085	0.950	113.5%	71.73%	0.620
226	DISC DRESSING MOISTURE	%0.0	0.000	0.005	0.005	%0.0		
227	GREEN BALL PELLETS	90.5%	0.864	0.091	0.955	113.5%	71.73%	0.620
228	COMBINED GREEN BALL O/S & U/S	90.5%	0.035	0.004	0.038	4.5%	71.73%	0.025
229	SIZED GREEN BALL PELLETS	90.5%	0.830	0.087	0.917	109.0%	71.73%	0.595

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BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE
16-Sept-1999

(MIDREX SHAFT FURNACE - 30% DRI CHARGE)

Revision A: ORINDURATED PELLET PRODUCTION: (BFD-006)

STREAM	STREAM LABLE	SOLIDS %	DRY SOLIDS	LIQUID	TOTAL	SOLIDS %	%F.P.	FALINITS
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
229	SIZED GREEN BALL PELLETS	90.5%	0.830	0.087	0.917	109.0%	71.73%	0.595
230	INDURATED PELLETS (GROSS)	100.0%	0.841	0.000	0.841	110.5%	70.74%	0.595
231	INDURATED PELLETS (NET)	100.0%	0.785	0.000	0.785	103.1%	70.74%	0.555
232	CRUSHED OVERSIZE PELLETS	100.0%	0.000	0.000	0.000	0.0%	70.74%	0.000
233	UNDERSIZE INDURATED PELLETS	100.0%	0.000	0.000	0.000	%0.0	70.74%	000.0
234	RECYCLED INDURATED PELLET DUST/FINES	100.0%	0.056	0.000	0.056	7.4%	70.74%	0.040
235	P.P. DUST SLURRY WATER	%0'0	0.000	0.298	0.298		_	
203	P.P. DUST SLURRY TO PELLET FEED	15.0%	0.053	0.298	0.351	6.9%	70.74%	0.040
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	0.000	0.000	0.000	%0.0	70.74%	0.000

IMSDRI30 BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE 16-Sept-1999 (MIDREX SHAFT FURNACE - 30% DRI CHARGE) Revision A: ORDRI SYSTEMS, 1 OF 2 (PFD-007)

CATOTA S.	STRING A CAURI STSTEMS, T OF 2 (PTU-507)							
NUMBER	O KEAW LABLE	% SOLIDS	URY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (T/HR)
253	RECLAIMED PELLETS/LUMP ORE	100.0%	0.7848	0.0000	0.7848	103.1%	70.74%	0.5552
209	-6 mm OXIDE TO PELLETIZING (ORE/PELLETS)	100.0%	0.0235	0.0000	0.0235	3.1%	70.74%	0.0167
299	REMET (OTHER) CHARGED TO SHAFT FCE.	100.0%	0.0000	0.0000	0.0000	%0.0	70.74%	0.000
300	NET ORE/PELLETS, ETC. TO SHAFT FCE.	100.0%	0.7612	0.0000	0.7612	100.0%	70.74%	0.5385
301	COATING LIME	100.0%	0.0095	0.0000	0.0095	1.2%		
302	LIME COATING WATER	%0.0	0.0000	0.0284	0.0284	%0.0		
303	NET FURNACE FEED	96.4%	0.7707	0.0284	0.7991	101.2%	69.88%	0.5385
304	OFF-GASSES (INCL. DUSTAWV)	43.0%	0.1661	0.2205	0.3866	21.8%	87.80%	0.1459
305	GAS QUENCH SCRUB WATER (MM TPY)	0.0%	0.0000	73.8987	73.8987	%0.0		
306	FURNACE DUST TO DUST SCRUBBERS	100.0%	0.0304	0.0000	0.0300	3.9%	87.80%	0.0264
307	FURNACE DUST SCRUB WATER	%0:0	0.0000	2.3448	2.3448	0.0%		~.
308	FCE DUST SLURRY TO CLASSIFIER	1.3%	0.0300	2.3448	2.3748	3.9%	87.80%	0.0264
309	GAS QUENCH SCRUBBER BLOWDOWN	%9.9	0.1661	2.3448	2.5109	21.8%	87.80%	0.1459
208	COARSE SOLIDS FROM CLASSIFIER	75.0%	0.0565	0.0188	0.0754	7.4%	87.80%	0.0496
310	DE-GRITTED FCE. SCRUB BLOW-DOWN	80.76	0.1396	4.6707	4.8103	18.3%	87.80%	0.1226
311	PRODUCT SILO SCRUBBER BLOW-DOWN	0.4%	0.0062	1.6079	1.6140	0.8%	92.80%	0.0057
312	OXIDE SCREEN SCRUBBER BLOW-DOWN	100.0%	0.0080	1.6079	1.6159	1.1%	70.74%	0.0057
313	COMPRESSOR COOLING WATER	%0.0	0.0000	6.6994	6.6994	%0.0		
314	PRODUCT SCREEN SCRUBBER	0.6%	0.0150	2.3448	2.3598	2.0%	92.80%	0.0139
315	NET CLARIFIER FEED	0.5%	0.1688	91.0498	91.2186	22.2%	87.61%	0.1479

IMSDRI30

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE
16-Sept-1999

(MIDREX SHAFT FURNACE - 30% DRI CHARGE)

Revision A: ORDRI SYSTEMS, 2 OF 2 (PFD-008)

STREAM	STREAM LABLE	SGITOS %	ᆫ	dinoi1	TOTAL	% SOLIDS	%Fe	Fe UNITS
NUMBER			(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
316	CLAR, DECANT TO COOLING SYSTEMS	%0.0	0.0000	90.093	90.093	0.0%		
317	DRI TO SCREENS	100.0%	0.3674	0.000	0.367	48.3%	92.80%	0.3410
318	DRI WITH FINES REMOVED	100.0%	0.3527	0.000	0.353	46.3%	92.80%	0.3273
319	DRI FROM SILOS	100.0%	0.3527	0.000	0.353	46.3%	92.80%	0.3273
320	EXCESS DRI TO SALES	100.0%	0.0000	0.000	0.000	%0.0	92.80%	0.000
321	DRI TO EAF STORAGE HOPPERS	100.0%	0.3527	0.000	0.353	46.3%	92.80%	0.3273
322	GAS QUENCH O/F WATER TO CLARIFIER	%0.0	0.0000	74.119	74.119	%0.0		
323	INERT GAS (MM Nm3/YR)	%0.0	0.0000	43.000	43.000	%0:0		··
324	DRI SCREEN FINES TO EAF INJECTION	100.0%	0.0147	0.000	0.015	1.9%	92.80%	0.0136

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (MIDREX SHAFT FURNACE - 30% DRI CHARGE)

16-Sept-1999 IMSDR130

Revision A:	Revision A: OREAF STEELMAKING/LMF (PFD-009)	BASIS:	8,000	HRS/YR EAF/LA	8,000 HRS/YR EAF/LMF/CASTING OPERATION	RATION		1
STREAM	STREAM LABLE	SOLIDS %	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	MM T/YR)	% OF SLAB	%Fe (DRY)	(MM T/YR)
00	אס טר מסס אומר ואדטד	700 007		000 0	0.367	70 30	7808 60	
000		% 0.001		0.000	0.30	9/0.04		-
401	LUMP LIME FLUX TO EAF	100.0%	0.013	0.000	0.013	1.6%		
402	SILICA FLUX	100.0%	00000	0000	0.000	%0.0		
403	MISC. ADDITIVES (AI, FeMn, FeSi, etc.)	100.0%	0.007	0.000	0.007	4.2%	40.72%	0.013
404	STEEL CARBON (CHARGED+SLAG INJ.)	100.0%	0.012	0.000	0.012	7.1%		
405	EAF ELECTRODES	100.0%	0.004	0.000	0.004	1.1%		
406	TOTAL EAF COOLING WATER CIRC. (MM NM3/YR)	0.0%	0.000	70.627	70.627	%0.0		
407	REVERT SCRAP	100.0%	0.048	0.000	0.048	6.4%	%02'66	0.048
408	PURCHASED SCRAP	100.0%	0.688	0.000	0.688	90.4%	89.70%	0.686
409	NET SCRAP CHARGED	100.0%	0.736	0.000	0.736	%2'96	%02.66	0.734
410	TOTAL FLUX & ADDITIVES CHARGED	100.0%	0.032	0.000	0.032	4.2%	40.75%	0.013
411	REFRACTORIES CONSUMMED	100.0%	0.015	0.000	0.015	1.9%		
412	PROCESS/COOLING WATER OUT OF EAF (MM NM3/YR)	%0.0	0.000	70.627	70.627	%0.0		
413	EAF SLAG (LIQUID)	%0.0	0.000	0.158	0.158	%0.0	25.60%	0.041
414	EAF DUST TO EAF DUST COLLECTION	100.0%	0.020	0.000	0.020	2.6%	48.50%	0.010
415	OXYGEN GAS TO FURNACE (MM Nm3/YR)	%0.0	0.000	11.812	11.812	%0.0		
416	LIQUID EAF STEEL TO LADLE REFINING	%0.0	000.0	1.054	1.054	%0.0	%02'66	1.051
417	PULVERIZED LIME TO LADLE REF. FCE.	100.0%	0.005	0.000	0.005	0.7%		
418	SLAGWIRE DESULFURIZER TO LRF	100.0%	0.0004	0.0000	0.0034	0.4%		
419	ARGON GAS TO LRF (MM Nm3/YR)	%0:0	0.000	0.063	0.063	%0.0		

D.O.E. IRONMAKING - 30% SHAFT FCE DRI, 1.0 WT.% CARBON, Rev. 2

IMSDRI30

16-Sept-1999

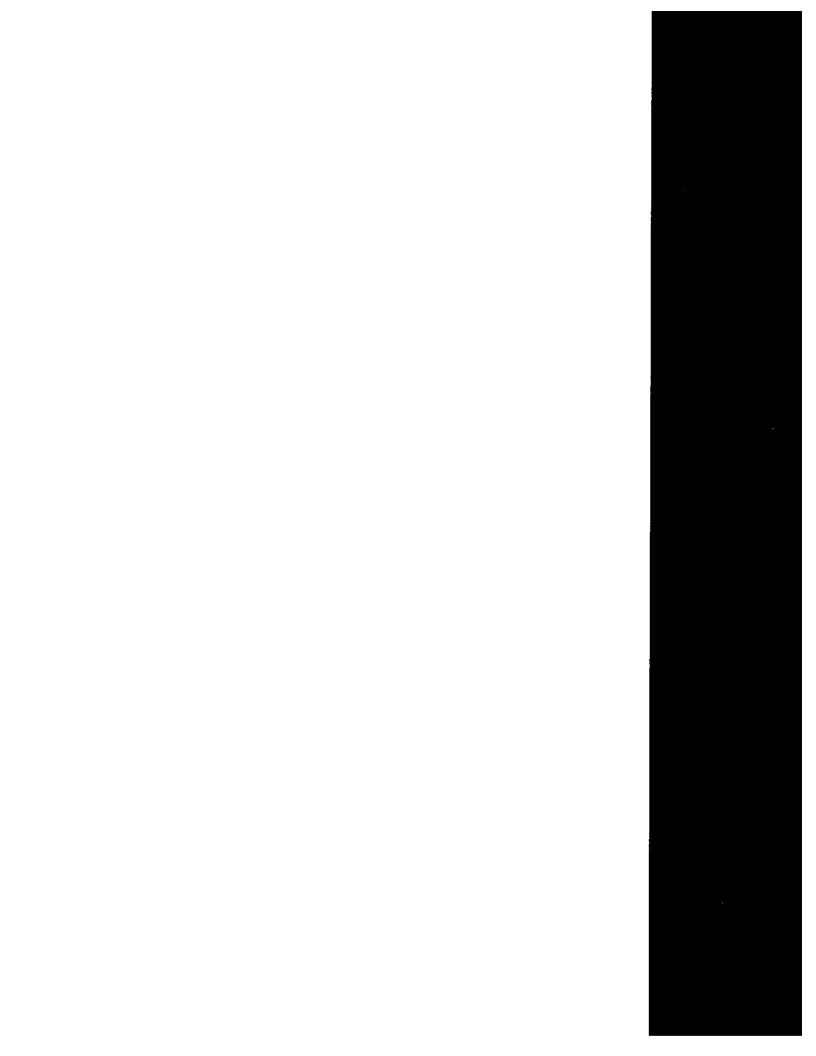
(MIDREX SHAFT FURNACE - 30% DRI CHARGE)

Revision A: OREAF STLMAKING/LMF (PFD-009), CASTING (PFD-010)

BASIS:

0 (MM T/YR)

Revision A:	Revision A: OREAF STLMAKING/LMF (PFD-009), CASTING (PFD-010)	BASIS:	٥	0 (MM T/YR)				
STREAM	STREAM LABLE	so⊓os %	DRY SOLIDS	LIQUID	TOTAL	% OF SLAB	%Fe	Fe UNITS
NOMBER			(MIM) I/YK)	(MINE 1/YK)	(MIN I/YK)	0- DRI FD	(DRY)	(MM 1/YR)
420	SLAG & LOSSES FROM LRF	%0:0	0.000	0.007	0.007	%0.0	31.80%	0.002
421	REFINED STEEL TO CASTING	%0.0	0.000	1.052	1.052	%0.0	89.70%	1.049
422	PULVERIZED LIME FLUX TO EAF	100.0%	0.014	0.000	0.012	1.5%		
423	WATER FOR EAF DUST TRANSPORT	0.0%	0.000	0.112	0.112	%0.0		
424	PROC. COOLING WATER LMF	%0:0	0.000	14.125	14.125	%0.0		
425	TOTAL SLAG OUTPUT (AS SOLID)	100.0%	0.158	0.000	0.158	20.8%	26.96%	0.043
501	SLAB SCALE	%0.0	0.005	0.000	0.005	%2'0	80.00%	0.004
502	LADLE SCRAP	%0:0	0.024	0.000	0.024	3.1%	%02'66	0.024
503	TUNDISH SCRAP	100.0%	0.006	0.000	0.006	%8'0	%07.66	90000
504	CROP END SCRAP	%0:0	0.018	0.000	0.018	2.4%	%02'66	0.018
505	MOLD POWDER TO CASTING	100.0%	0.0006	0.000	0.001	11.3%		
506	TUNDISH POWDER TO CASTING	100.0%	0.0003	0.000	0.000	3.5%		
507	MOLD COOLING WATER (MM NM3/YR)	%0.0	0.000	29.206	29.206	%0.0		
508	CONTACT COOLING WATER (MM NM3/YR)	%0.0	0.164	9.600	9.764	21.5%		
509	NET STEEL TO CASTING	%0:0	0.000	0.999	666.0	0.0%	%02'66	0.996
510	TOTAL CAST SLAB PRODUCT	100.0%	0.977	0.000	0.977	128.3%	%02'66	0.974
511	THIN SLAB TO HOT BAND	i0//\lq#	0.000	0.000	0.000	0.0%	%02'66	00000
512	SLABS TO SALES	100.0%	0.977	0.000	226.0	128.3%	%02.66	0.974
513	HOT BAND TO SALES	100.0%	0.000	0.000	0.000	%0:0	%02'66	0.000



APPENDIX D-4 100% SCRAP CHARGED TO EAF

IMSDRI30
16-Sept-1999
(100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)
Revision A: OREBODY ASSUMPTIONS

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	BASIS:	7,940 HRS/YR CONCENTRATOR/PELLET/DRI OPERATION	ON
		8,000 HRS/YR EAF/LMF/CASTING OPERATION	TARGET
TOTAL PLAN	TOTAL PLANT PRODUCTION (DRY BASIS):		
2.087	MM TONNES/YEAR AS-MINED ROCK	T/HR ORE1 CONC. NET FEED 68.557%	IRON UNITS IN CONC. 68.5507%
0.825	MM TONNES/YEAR NET ORE TO CONCENTRATOR	T/HR ORE2 U.000%	MONITS MONITS
0.486	MM TONNES/YEAR NET CONCENTRATE	1/HK OKES 0.000/	INOM UNITS 89.36% AS EE304
0000	MM TONNES/YEAR LUMP ORE3	T/HR NET DRI ORE FEED	09:36/0
0.830	MM TONNES/YEAR GREEN BALL PELLET (+6mm)	122.1 T/HR SLAB PRODUCED 8,000 F	10.6470
0.841	MM TONNES/YEAR TOTAL INDURATED PELLET		
0.785	MM TONNES/YEAR NET INDURATED PELLET (+6mm)	DRI PROD. 2.072	Fe KECOV
0.761	MM TONNES/YEAR FEED TO DRI FCE.	0.977 SLAB PROD. 0.000 DRI TO SLAB	60.000% Wt.% RECOV 58.900%
0.000	MM TONNES/YEAR DRI	CONCENTRATOR DEWATERING	
0.977	MM TONNES/YEAR NET SLAB PRODUCT (BALANCE)	65.0% WT.% SOLIDS IN CONC. THICK. U/F	1.014 RATIO INDUR./G.B. PELLET
0.000	MM TONNES/YEAR HOT BAND SLAB	35.0% WT.% SOLIDS IN TAILS. THICK. U/F	
0.977	MM TONNES/YEAR NET SLAB PRODUCT	0.0% FEED DIVER. TO THICK % OF FEED	
1.000	MM TONNES/YEAR LIQUID STEEL (TARGET)	10.0% FILTER FEED O/F - % OF FEED	
779.0	MM TONNES/YEAR NET SLAB PRODUCT (TARGET)	DRI PLANT	
	CONCENTRATOR	3.0% PERCENT OF PELLET FINES - WT.% PEL.	0.00% SILICA FLUX - % EAF FD
60 474°/	WASTE ROCK - % OF MINED	10.0% PERCENT OF LUMP FINES - WT.% LUMP	0.65% MISC. ADDIT % EAF FD
3 000%	AS, MINED BOCK MOISTURE - %	4.0% PERCENT DUST - WT.% OF OXIDE FEED	0.83% C CHARGED - % EAF FD
%0000	AS MINED POCK IRON (INITS - WT % IRON		0.35% ELECTRODES - % EAF FD
30.000 /8	ODE BOCK IDON INITS - WT % IRON		3.87% PUL. LIME EAF - % EAF FD
20.000%			1.34% REFRACTORIES - % EAF FD
70.0%	GRIZZLY SCREEN C/S - % OF FEED		
200.0%	CIRCULATING LOAD - +10 mm TO LEKTIARY (% FEED)		
%0.0	PERCENT FEED TO SECONDARY 2 (%)		
%0.0	PERCENT FEED TO TERTIARY 4 (%)		
300.0%	BALL MILL CIRCULATING LOAD (% OF FEED)	1.68% SOLIDS IN SILO DUST - % OF DRI PROD.	
65.0%	BALL MILL PERCENT SOLIDS (% OF FEED)	1.06% SOLIDS IN OXIDE SCRN DUST - %DRI FD	
35.0%	B.M. CYCLONE O/F PERCENT SOLIDS (%)	4.08% SOLIDS IN DRI SCRN DUST - %DRI PROD	98.00% YIELD HOT BAND - % TS
4 60%	GROUND ORE LOSSES TO SLIMES - WT.%	93.00% METALLIZATION - WT.% Fet IN DRI	1.74% CROP ENDS - % M. STL
2 00%	DESLIME CYCLONE O/F PERCENT SOLIDS (%)		4.60% TOTAL REVERT - %M. STL
68.21%	STG.1 MAG. CONC. RECOVERY - WT.% OF FEED	6.7% PERCENT DUST/FINES - WT.% OF G.B.	
86.39%	STG. 1 IRON UNIT RECOVERY - WT.% OF IRON UNITS	2.0% PERCENT U/S GREEN BALL PELLETS	
95.30%	STG. 2 MAG. CONC. WT. RECOVERY - WT.% OF FEED	2.0% PERCENT O/S GREEN BALL PELLETS	0.04% SLG TO LMF - % M. STL
98.50%	STG. 2 MAG. CONC. IRON UNIT RECOV WT.% OF IU	0.0% PERCENT U/S INDURATED PELLETS	0.64% SLG FR. LMF - %MS
98 60%	STG. 3 MAG. CONC. RECOV WT.% OF FEED	0.0% PERCENT O/S INDURATED PELLETS	0.060 ARGON TO LIME - NIM3/T MS
80 50%	STG. 3 MAG. CONC. IRON UNIT RECOV WT.% OF IU	25.0% PERCENT O/S P.P. DUST - % DUST/FINES	0.50% SLAB SCALE - %MS
200.00	PEGRIND MILL CIRCLII ATING LOAD (% OF FEED)		0.06% MOLD POWDER - % M. STL.
65.00%	PEGRIND MILE SOLIDS (WT.%)		0.03% TUND, POWDER - % M. STL.
%00.00	S EL OTATION IBON CONC. WT % OF FEED		100.00% SLAB PROD % OF PROD.
93.00 /8	S.EL OTATION IRON INIT RECOV WT.% OF IU		0.27% SLAG C INJ WT% M. STL
92:30%	GAN REJECT, MAG, SEP WT.% OF FEED		25.60% %Fe IN EAF SLAG
98.57%	GAN. REJECT, MAG. SEP WT.% OF IU	0.0% EXCESS PELLETS TO SALES -% OF TOTAL	
RED = ASSI	RED = ASSIMPTION INPIT (DATA OR EXPERIENCE)	BLUE = DERIVED VARIABLE	
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IMSDRI30 16-Sept-1999 Revision A. 1	BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)	KING WATE HER IRON U	R & SOLIDS NITS CHAR(BALANCE SED)				2 of 13
	STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
1001	AS-MINED ROCK	%0′26	2.087	0.065	2.152	274.2%	30.00%	0.626
1002	WASTE ROCK	97.0%	1.262	0.039	1.301	165.8%	16.93%	0.214
***	IRON ORE TO CONCENTRATOR (CRUSHING)	97.0%	0.825	0.026	0.851	108.4%	20.00%	0.413
2	PRODUCT FROM PRIMARY CRUSHER (80% -130 mm)	%0'.26	0.825	0.026	0.851	108.4%	20.00%	0.413
ო	FEED TO GRIZZLY (Secondary 1)	%0'.26	0.825	0.026	0.851	108.4%	20.00%	0.413
	FEED TO GRIZZLY (Secondary 2)	%0''26	0.000	0.000	0.000	%0:0	%00.09	0.000
4	OS FROM GRIZZLY (Secondary 1)	%0.76	0.578	0.018	0.595	75.9%	\$0.00%	0.289
4	OS FROM GRIZZLY (Secondary 2)	80.78	0.000	000.0	0.000	%0:0	20.00%	0.000
S	US FROM GRIZZLY (Secondary 1)	%0'.26	0.248	0.008	0.255	32.5%	20.00%	0.124
cy B	US FROM GRIZZLY (Secondary 2)	%0′.26	000.0	0.000	0.000	%0:0	20.00%	0.000
9	US FROM SECONDARY 1 (80% -37 mm)	%0'.26	0.578	0.018	0.595	75.9%	20.00%	0.289
Q	US FROM SECONDARY 2 (80% -37 mm)	%0'.26	0.000	0.000	0000	%0.0	20.00%	0.000
7	TOTAL FEED TO TERTIARY CRUSHERS (+10 mm)	%0′26	1.650	0.051	1.701	216.8%	20.00%	0.825
7 a	US FROM TERTIARY 1 (80% -10 mm)	%0'.26	0.550	0.017	0.567	72.3%	20.00%	0.275
7 p	US FROM TERTIARY 2 (80% -10 mm)	%0'.26	0.550	0.017	0.567	72.3%	20.00%	0.275
7 0	US FROM TERTIARY 3 (80% -10 mm)	%0'.26	0.550	0.017	0.567	72.3%	20.00%	0.275
p 7	US FROM TERTIARY 4 (80% -10 mm)	%0′.26	0.000	0.000	0.000	%0.0	20.00%	0.000
80	TOTAL FEED TO TERTIARY SCREENS	%0'.26	2.475	0.077	2.552	325.2%	20.00%	1.238
σ	UNDERSIZE FROM TERTIARY SCREENS (-10 mm)	%0'.26	0.825	0.026	0.851	108.4%	50.00%	0.413
10	TOTAL FEED TO BALL MILLS (-10 mm)	97.0%	0.825	0.026	0.851	108.4%	50.00%	0.413
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BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE

IMSDRI30	BASE CASE IRON/STEE	KING WATE	LMAKING WATER & SOLIDS BALANCE	BALANCE				3 of 13
STREAM	1 1	SOITOS %	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
10 a	FEED TO BALL MILLS 1&2 (-10 mm)	97.0%	0.413	0.013	0.425	54.2%	20.00%	0.206
10 b	FEED TO BALL MILLS 3&4 (-10 mm)	%0′26	0.413	0.013	0.425	54.2%	50.00%	0.206
£.,	TOTAL FEED TO BALL MILLS (-10 mm)	%0'.26	0.413	0.013	0.425	54.2%	50.00%	0.206
11 a	FEED TO BALL MILL 1 (-10 mm)	%0'.26	0.206	0.006	0.213	27.1%	50.00%	0.103
11 b	FEED TO BALL MILL 2 (-10 mm)	%0.76	0.206	900.0	0.213	27.1%	50.00%	0.103
14 c	FEED TO BALL MILL 3 (-10 mm)	%0.76	0.206	900.0	0.213	27.1%	50.00%	0.103
14 d	FEED TO BALL MILL 4 (-10 mm)	%0'.26	0.206	0.006	0.213	27.1%	50.00%	0.103
12	TOTAL FEED TO BALL MILL CYCLONES	65.0%	2.063	1.111	3.173	271.0%	50.00%	1.031
73	TOTAL B.M. CYCLONE UNDERFLOW	7.8%	1.238	14.528	15.766	162.6%	50.00%	0.619
4	TOTAL B.M. MAKEUP WATER	%0.0	0.000	14.950	14.950			**************************************
15	TOTAL B.M. CYCLONE OVERFLOW	35.0%	0.825	1.532	2.357	108.4%	50.00%	0.413
21	ORE SLIMES TO TAILINGS	5.0%	0.038	0.721	0.759	2.0%	29.80%	0.011
22	DE-SLIMED ORE TO MAG. SEP.	49.3%	0.787	0.811	1.598	103.4%	50.97%	0.401
23	MAG. SEP. 1 DILUTION WATER	%0.0	0.000	31.600	31.600			
24	NET FEED TO MAG. SEP. 1	2.4%	0.787	32.411	33.198	103.4%	50.97%	0.401
25	MAG. SEP 1 TAILS	11.9%	0.250	1.852	2.103	32.9%	21.43%	0.054
26	MAG. SEP. 1 CONC.	1.7%	0.537	30.559	31.096	70.5%	64.74%	0.348
27	MAG. SEP. 2 DILUTION WATER	%0.0	0.000	14.300	14.300			
28	NET FEED TO MAG. SEP. 2	1.2%	0.537	44.859	45.396	70.5%	64.74%	0.348
29	MAG. SEP 2 TAILS	1.5%	0.025	1.657	1.682	3.3%	24.62%	0.006
30	MAG. SEP. 2 CONC.	1.2%	0.512	43.202	43.713	67.2%	66.72%	0.341

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BALANCE
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16-Sept-1999	IRON ORE CONCEN		1					
STREAM	STREAM LABLE	% sorids	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	(MM T/YR)
31	MAG. SEP. 3 DILUTION WATER	%0.0	0.000	13.900	13.900			
32	NET FEED TO MAG. SEP. 3	%6.0	0.512	57.102	57.613	67.2%	66.72%	0.341
33	MAG. SEP 3 TAILS	1.5%	0.007	0.470	0.478	%6:0	23.83%	0.002
34	MAG. SEP. 3 CONC.	%6.0	0.505	56.631	57.136	96.3%	67.33%	0.340
35	REGRIND MILL DISCHARGE	65.0%	1.009	0.543	1,552	132.6%	%00:0	0.000
36	NET FEED TO REGRIND MILL CYCLONE	2.6%	1.514	57.175	58.688	198.8%	67.33%	1.019
37	REGRIND MILL CYCLONE O/F PRODUCT TO FLOTATION	%6.0	0.505	56.631	57.136	66.3%	67.33%	0.340
38	REGRIND MILL CYCLONE U/F TO MILL	65.0%	1.009	0.543	1.552	132.6%	67.33%	0.679
39	REGRIND MILL DILUTION WATER	%0.0	0.000	0.000	0.000			
40	FLOTATION DILUTION WATER	%0.0	0.000	5.100	5.100			

STREAM NET EXAMINATE NET SOLIDS TOTAL SOLIDS With TYRS TOTAL SOLIDS With TYRS CENTREAM With TYRS WITH TYRS OF DRI TO CORDITION CORDITION </th <th>IMSDRI30 16-Sept-1999</th> <th>BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)</th> <th>KING WATE HER IRON U</th> <th>R & SOLIDS NITS CHAR(</th> <th>BALANCE SED)</th> <th></th> <th></th> <th></th> <th>5 01 13</th>	IMSDRI30 16-Sept-1999	BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)	KING WATE HER IRON U	R & SOLIDS NITS CHAR(BALANCE SED)				5 01 13
FLOATION CHEMICALS 0.0% 0.060 0.060 0.060 0.060 0.060 0.060 0.060 0.060 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.078 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080	Revision A: STREAM NUMBER	ORIRON ORE CONCENTRATOR (PFD-002) STREAM LABLE	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
NET FLOTATION FEED 0.8% 0.506 61.781 62.286 66.5% 67.33% FLOAT TAILS - Fe CONC. TO MAG. IV 0.8% 0.499 61.766 62.267 66.6% 67.7% SULFUR FLOAT REJECTS TO TAILS 27.0% 0.006 0.014 0.019 0.7% 33.66% MAG. SEP, 4 CONC. 0.8% 0.486 66.881 66.887 66.887 66.887 68.36% 68.56% MAG. SEP, 4 CONC. 1.5% 0.014 0.887 6.638 68.56% 68.56% MAG. SEP, 4 CONC. 1.5% 0.014 0.887 66.38% 68.56% 68.56% CONCENTRATE TO PIPELINE FEED 65.0% 0.006 60.619 60.619 1.8% 68.56% EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.0% 0.039 5.601 5.941 44.5% 23.41% DEWASTEINGS TO DISPOSAL 3.50 0.000 0.460 0.460 44.5% 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 5.232 5.232 5.232 <t< th=""><th>41</th><td>FLOTATION CHEMICALS</td><td>%0.0</td><td></td><td>0.050</td><td>0.050</td><td></td><td></td><td></td></t<>	41	FLOTATION CHEMICALS	%0.0		0.050	0.050			
FLOAT TAILS - Fe CONC. TO MAG. IV 0.8% 0.499 61.768 61.768 66.267 65.6% 67.77 SULFUR FLOAT REJECTS TO TAILS 27.0% 0.005 0.004 0.009 0.0014 0.0019 0.07% 33.86% 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.0000 0.000 0.000 0.0000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	45	NET FLOTATION FEED	0.8%		61.781	62.286	%6.3%	67.33%	0.340
MAG. SEP. 4 CONC. 0.006 0.014 0.019 0.7% 33.66% MAG. SEP. 4 CONC. 0.8% 0.486 60.881 61.367 63.8% 68.56% MAG. SEP. 4 CONC. 1.5% 0.014 0.887 0.900 1.8% 35.68% CONCENTRATE TO PIPELINE FEED 65.0% 0.004 0.006 60.619 60.619 1.8% 35.68% CONCENTRATE TO PIPELINE FEED 0.0% 0.000 60.619 60.619 1.8% 35.68% EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.0% 0.033 5.601 5.941 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 0.0% 0.033 0.630 0.969 44.5% 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460	43	FLOAT TAILS - Fe CONC. TO MAG. IV	0.8%		61.768	62.267	65.6%	67.67%	0.338
MAG. SEP. 4 CONC. 0.8% 0.4% 60.881 61.367 63.8% 68.56% MAG. SEP. 4 CONC. MAG. SEP. 4 CANGUE REJECT TO TAILS 1.5% 0.014 0.887 66.88% 68.56% CONCENTRATE TO PIPELINE FEED 6.0 0.048 0.262 0.748 63.8% 68.56% EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.0 0.000 60.619 44.5% 63.8% 68.56% DEWATERED TAILINGS TO DISPOSAL 35.0% 0.339 5.601 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 0.00 0.000 4.972 4.972 3.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 0.460 5.232 5.232 EVAPORATION FROM P.W. POND 0.0% 0.000 5.232 5.232 5.232 TOTAL INPUTS TO P.W. POND 0.000 77.283 77.283 77.283 TOTAL CONCENTRATOR WATER INPUTS 0.000 77.283 77.283 77.283	44	SULFUR FLOAT REJECTS TO TAILS	27.0%		0.014	0.019	0.7%	33.66%	0.002
MAG. SEP. 4 GANGUE REJECT TO TAILS 1.5% 0.014 0.887 0.900 1.8% 35.69% CONCENTRATE TO PIPELINE FEED 65.0% 0.486 0.262 0.748 63.8% 68.56% EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.0% 0.000 60.619 60.619 60.619 63.8% 68.56% TOTAL REJECTS TO TAILS 5.7% 0.339 0.630 6.61 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 35.0% 0.339 0.630 44.5% 23.41% TAILS THICKENER DECANT TO P.W. POND 0.0% 0.000 4.972 4.972 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 5.232 5.232 5.234 EVAPORATION FROM P.W. POND 0.0% 0.000 71.283 71.283 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.000 79.900 79.900 79.900	45	MAG. SEP. 4 CONC.	0.8%		60.881	61.367	63.8%	68.56%	0.333
CONCENTRATE TO PIPELINE FEED 65.0% 0.486 0.262 0.748 63.8% 68.56% EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.0% 0.000 60.619 60.619 60.619 68.56% TOTAL REJECTS TO TAILS 5.7% 0.339 0.630 0.690 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 35.0% 0.339 0.630 4.972 4.972 23.41% TAILS THICKENER DECANT TO P.W. POND 0.0% 0.000 6.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460 0.460	46	MAG. SEP. 4 GANGUE REJECT TO TAILS	1.5%		0.887	0.900	1.8%	35.69%	0.005
EXCESS WATER FROM CONC. THICK. TO P.W. POND 0.00% 0.000 60.619 60.619 44.5% 23.41% TOTAL REJECTS TO TAILS 5.7% 0.339 5.601 6.601 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 35.0% 0.039 4.972 44.5% 23.41% TAILS THICKENER DECANT TO P.W. POND 0.0% 0.000 4.972 4.972 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 5.232 5.232 5.232 FRESH WATER MAKEUP TO P.W. POND 0.0% 0.000 71.283 71.283 71.283 TOTAL INPUTS TO P.W. POND 0.0% 0.000 79.900 79.900 79.900	47	CONCENTRATE TO PIPELINE FEED	65.0%		0.262	0.748	63.8%	68.56%	0.333
TOTAL REJECTS TO TAILS 5.7% 0.339 5.601 5.941 44.5% 23.41% DEWATERED TAILINGS TO DISPOSAL 35.0% 0.339 0.630 0.969 44.5% 23.41% TAILS THICKENER DECANT TO P.W. POND 0.0% 0.000 4.972 4.972 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 5.232 5.232 5.232 EVAPORATION FROM P.W. POND 0.0% 0.000 3.564 3.564 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.000 71.283 71.283 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.000 79.900 79.900 79.900	48	EXCESS WATER FROM CONC. THICK. TO P.W. POND	%0.0		60.619	60.619			
DEWATERED TAILINGS TO DISPOSAL 35.0% 0.339 0.630 44.5% 23.41% TAILS THICKENER DECANT TO P.W. POND 0.0% 0.000 4.972 4.972 23.41% EXCESS WATER FROM TAILS POND 0.0% 0.000 5.232 5.232 5.232 EVAPORATION FROM P.W. POND 0.0% 0.000 3.564 3.564 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.0% 0.000 71.283 71.283 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.000 79.900 79.900 79.900 79.900	49	TOTAL REJECTS TO TAILS	5.7%		5.601	5.941	44.5%		0.079
TAILS THICKENER DECANT TO P.W. POND 0.0% 0.0% 4.972 EXCESS WATER FROM TAILS POND 0.0% 0.0% 0.460 FRESH WATER MAKEUP TO P.W. POND 0.0% 0.0% 5.232 EVAPORATION FROM P.W. POND 0.0% 0.0% 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.0% 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.000 79.900	90	DEWATERED TAILINGS TO DISPOSAL	35.0%		0.630	0.969	44.5%		0.079
EXCESS WATER FROM TAILS POND 0.0% 0.000 0.460 FRESH WATER MAKEUP TO P.W. POND 0.0% 0.0% 5.232 EVAPORATION FROM P.W. POND 0.0% 0.0% 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.0% 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.0% 79.900	51	TAILS THICKENER DECANT TO P.W. POND	%0:0		4.972	4.972			
FRESH WATER MAKEUP TO P.W. POND 0.0% 0.000 5.232 EVAPORATION FROM P.W. POND 0.0% 0.0% 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.0% 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 79.900	52	EXCESS WATER FROM TAILS POND	%0.0		0.460	0.460			
EVAPORATION FROM P.W. POND 0.0% 0.0% 3.564 TOTAL INPUTS TO P.W. POND 0.0% 0.0% 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.0% 0.0% 79.900	53	FRESH WATER MAKEUP TO P.W. POND	%0.0		5.232	5.232			
TOTAL INPUTS TO P.W. POND 0.000 71.283 TOTAL CONCENTRATOR WATER INPUTS 0.00 79.900	54	EVAPORATION FROM P.W. POND	%0:0		3.564	3.564			
TOTAL CONCENTRATOR WATER INPUTS 0.000 79.900		TOTAL INPUTS TO P.W. POND	%0.0		71.283	71,283			
	55	TOTAL CONCENTRATOR WATER INPUTS	%0.0		79.900	79.900			

D.O.E. - 100% STEEL SCRAP CHARGE TO EAF, Rev. 2

IMSDRI30 16-Sept-1999	ON/STEE! EAF - NO	ING WATER ER IRON UR	.MAKING WATER & SOLIDS BALANCE OTHER IRON UNITS CHARGED)	BALANCE SED)				6 of 13
Revision A: STREAM	Revision A: ORPIPELINE & ORE RECEIVING (PFD-003) STREAM STREAM STREAM	SOLIDS %	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
NUMBER 43	CONCENTRATE SLURRY FROM PIPELINE	65.0%	0.486	0.262	0.748	63.8%	68.56%	0.333
101	CONCENTRATE FEED TO DEWATERING	65.0%	0.486	0.262	0.748	63.8%	68.56%	0.333
102	NET FILTER FEED	%0.09	0.897	0.598	1.495	117.8%	73.60%	0.660
103	FEED SLURRY DIVERSION TO THICKENERS	%0′59	0.000	0.000	0.000	%0.0	68.56%	0.000
104	FILTER CAKE	92.0%	0.807	0.070	0.877	106.0%	73.60%	0.594
105	FILTRATE	%0.0	0.000	0.468	0.468			
106	FILTER O/F	80.09	060.0	090.0	0.149	11.8%	73.60%	0.066
107	LAUNDER WASH-DOWN WATER	0.0%	0.000	0.299	0.299			
108	NET FILTER O/F RETURN	20.0%	0.090	0.359	0.448	11.8%	73.60%	0.066
109	THICKENER FEED	48.8%	0.897	0.942	1.839	117.8%	73.60%	0.660
110	THICKENER DECANT	0.0%	0.000	0.344	0.344			
111	THICKENER U/F	%0.09	0.897	0.598	1.495	117.8%	73.60%	0.660
112	EXCESS WATER TO PROCESS WATER	0.0%	0.000	0.812	0.812			

D.O.E. - 100% STEEL SCRAP CHARGE TO EAF, Rev. 2

IMSDRI30 16-Sept-1999	BASE CASE IRON/STEEL (100% SCRAP CHARGE TO EAF - NO	ER IRON U	MAKING WATER & SOLIDS BALANCE OTHER IRON UNITS CHARGED)	BALANCE iED)	·			
Revision A: STREAM NUMBER	Revision A: ORSTOCKPILE, PELLET PLANT SLURRY/FINES HANDLING STREAM NUMBER	M SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
201	RECYCLE EAF DUST SLURRY	15.0%	0.020	0.112	0.132	2.6%	48.50%	0.010
202	RECYCLE DRI DUST SLURRY	15.0%	0.169	0.957	1.125	22.2%	87.61%	0.148
203	P.P. DUST/FINES SLURRY	15.0%	0.053	0.298	0.351	%6.9	70.74%	0.037
204	P.P. DUST SYSTEMS O.S.	80.0%	0.047	0.012	0.059	6.2%	70.74%	0.033
205	FEED TO P.P. THICKENER	18.2%	0.321	1.440	1.761	42.2%	81.23%	0.261
206	DECANT FROM P.P. THICKENER	0.0%	0.000	1.119	1.119			
207	U/F FROM P.P. THICKENER TO FEED THICK.	\$0.0%	0.321	0.321	0.643	42.2%	81.23%	0.261
208	DRI CLASSIFIER O/S	75.0%	0.057	0.019	0.075	7.4%	87.80%	0.050
209	-6 mm ORE/PELLET FINES	100.0%	0.024	0.000	0.024	3.1%	70.74%	0.017
210	INDURATED PELLET RECYCLE O/S & U/S	100.0%	000.0	0.000	00000	0.0%	70.74%	0.000
211	TOTAL FEED TO MILLING	80.6%	0.127	0.031	0.158	16.7%	78.32%	0.100
212	MILL MAKE-UP WATER	%0.0	0.000	0.054	0.054	%0:0		
213	GROUND FINES SLURRY TO P.P. THICKENER	%0.09	0.127	0.085	0.212	16.7%	78.32%	0.100
232	INDURATED PELLETS TO STOCKPILE	100.0%	0.785	0.000	0.785	103.1%	70.74%	0.555
250	RECLAIMED PELLETS	100.0%	0.785	0.000	0.785	103.1%	70.74%	0.555
251	LUMP ORE3 TO STOCKPILE	%0'.26	0.000	0.000	0.000	0.0%	0.00%	0.000
252	RECLAIMED LUMP ORE	%0'.26	0.000	0.000	0.000	%0.0	0.00%	0.000
253	PELLET/LUMP ORE TO FEED SILOS	100.0%	0.785	0.000	0.785	103.1%	70.74%	0.555
254	EXCESS PELLETS TO SALES	%0.0	0.000	0000	0.000	%0.0	70.74%	0.000

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)
EN BALL PELLET PRODUCTION: (BFD-005)

IMSDRI30 16-Sept-1999

Revision A:	Revision A: ORGREEN BALL PELLET PRODUCTION: (BFD-005) STREAM STREAM	% SOLIDS	DRY SOLIDS (MM T/YR)	LIQUID (MM T/YR)	TOTAL (MM T/YR)	SOLIDS % OF DRI FD	%Fe (DRY)	Fe UNITS (MM T/YR)
NOMBER 104	FILTER CAKE TO PELLET PLANT	92.0%	0.807	0.070	0.877	106.0%	73.60%	0.594
218	NET OXIDE FEED TO PELLETIZING	91.9%	0.842	0.074	0.916	110.6%	73.53%	0.619
219	PELLETIZING WATER	%0:0	00000	0.012	0.012	%0.0		
220	COKE TO PELLETIZING	100.0%	0.000	0.000	0.000	0.0%		
221	BINDER TO PELLETIZING	100.0%	0.005	000.0	0.005	0.7%	11.60%	0.001
222	DOLOMITE TO PELLETIZING	100.0%	0.017	0.000	0.017	2.3%	1.61%	0.000
223	LIMESTONE TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0		
224	HYDRATED LIME TO PELLETIZING	100.0%	0.000	0.000	0.000	%0.0		
225	PELLET FEED MIXTURE	91.0%	0.864	0.085	0.950	113.5%	71.73%	0.620
226	DISC DRESSING MOISTURE	%0.0	0000	0.005	0.005	%0.0		
227	GREEN BALL PELLETS	%9'06	0.864	0.091	0.955	113.5%	71.73%	0.620
228	COMBINED GREEN BALL O/S & U/S	%5.06	0.035	0.004	0.038	4.5%	71.73%	0.025
229	SIZED GREEN BALL PELLETS	%5'06	0.830	0.087	0.917	109.0%	71.73%	0.595

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)

IMSDRI30 BASE CASE IRON/STEELMAKING WATER &	16-Sept-1999 (100% SCKAP CHARGE 10 EAT - NO OILLEN INCOLUMN	CONTRACTOR OF THE PROPERTY (BELLEVILLE)
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Dovieion A	Powision A. OBINDURATED PELLET PRODUCTION: (BFD-006)			4111		/0 OCI 10 O	0, Ea	Fe LINITS
STREAM	STREAM LABLE	% SOLIDS	DRY SOLIDS	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
NUMBER			(21) (7)					
229	SIZED GREEN BALL PELLETS	90.5%	0.830	0.087	0.917	109.0%	71.73%	0.595
230	INDURATED PELLETS (GROSS)	100.0%	0.841	0.000	0.841	110.5%	70.74%	0.595
231	INDURATED PELLETS (NET)	100.0%	0.785	0.000	0.785	103.1%	70.74%	0.555
232	CRUSHED OVERSIZE PELLETS	100.0%	0.000	0.000	0.000	%0.0	70.74%	0.000
233	UNDERSIZE INDURATED PELLETS	100.0%	0.000	0.000	0.000	0.0%	70.74%	0.000
234	RECYCLED INDURATED PELLET DUST/FINES	100.0%	0.056	0.000	0.056	7.4%	70.74%	0.040
235	P.P. DUST SLURRY WATER	%0:0	0.000	0.298	0.298			
203	P.P. DUST SLURRY TO PELLET FEED	15.0%	0.053	0.298	0.351	%6'9	70.74%	0.040
210	INDURATED PELLET RECYCLE 0/S & U/S	100.0%	0.000	0.000	0.000	%0.0	70.74%	0.000

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)

IMSDRI30

46.Sent-1999	(100% SCRAP CHARGE TO EAF - NO O	EK IKON O	THER IRON ONLLS CLICATOR	.			1,0	STINITS
Revision A:	ORDRI S	SOLIDS %	DRY SOLIDS	CIONID	TOTAL	SOLIDS %	%re (DRY)	(T/HR)
STREAM			(MM T/YR)	(MIM L/TK)	A COLUMN TO THE PARTY OF THE PA	2	70 74%	0.5552
	ON THE PERIOD OF	100.0%	0.7848	0.0000	0.7848	103.1%	2	
253	RECLAIMED TELLET OF COMMENT OF CO	100.0%	0.0235	0.0000	0.0235	3.1%	70.74%	0.0167
209	-6 mm OXIDE TO PELLE ILING (ONE) TELET O	100.0%	0.0000	0.0000	0.0000	%0.0	70.74%	0.0000
299	REMET (OTHER) CHARGED 10 SHAFT FOE.	100.0%	0.7612	0.0000	0.7612	100.0%	70.74%	0.5385
300	NEI OKE/PERELO, FIO. 10	100.0%	0.0095	000000	0.0095	1.2%		
301	COATING LIME	%0.0	0.0000	0.0284	0.0284	%0.0		
302		96.4%	0.7707	0.0284	0.7991	101.2%	69.88%	_
303		43.0%	0.1661	0.2205	0.3866	21.8%	87.80%	0.1459
304		%0.0	0.0000	73.8987	73.8987	%0.0		
305		100.0%	0.0304	0.0000	0.0300	3.9%	87.80%	0.0264
306		%00		2.3448	2.3448	%0.0		
307		796			2.3748	3.9%	87.80%	6 0.0264
308		? (2.5109	21.8%	87.80%	0.1459
309	GAS QUENCH SCRUBBER BLOWDOWN	0,00			0.0754	7.4%	87.80%	0.0496
208	COARSE SOLIDS FROM CLASSIFIER	75.0%				18.3%	87.80%	0.1226
310	DE-GRITTED FCE, SCRUB BLOW-DOWN	%0''.6	0.1396					0.0057
311	PRODUCT SILO SCRUBBER BLOW-DOWN	0.4%	.% 0.0062	1.6079				
34.5		100.0%	0.0080	1.6079				
		0.0	0.000 0.0000	6.6994	t 6.6994			
<u> </u>		0.6	0.6% 0.0150	2.3448	3 2.3598	3 2.0%		
314		 ——	0.2% 0.1688	8 91.0498	91.2186	5 22.2%	87.61%	0.1479
315								

D.O.E. - 100% STEEL SCRAP CHARGE TO EAF, Rev. 2

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)

IMSDRI30 16-Sept-1999

Sevision A:	Bevision A: ORDRI SYSTEMS, 2 OF 2 (PFD-008)		301100	מווסו	TOTAL	% SOLIDS	%Fe	Fe UNITS
STREAM	STREAM LABLE	% SOLIDS	(MM T/YR)	(MM T/YR)	(MM T/YR)	OF DRI FD	(DRY)	(MM T/YR)
NUMBER		780		260 De	90.093	0.0%		
316	CLAR. DECANT TO COOLING SYSTEMS	0.0.0				,	i de	0777
317	DRI TO SCREENS	100.0%	0.3674	0.000	0.367	48.3%	92.80%	5 40.0
	DRI WITH FINES REMOVED	100.0%	0.3527	0.000	0.353	46.3%	92.80%	0.3273
, v	DRI FROM SILOS	100.0%	0.3527	0.000	0.353	46.3%	92.80%	0.3273
33	EXCESS DRI TO SALES	100.0%	0.0000	0.000	000.0	%0.0	92.80%	0.0000
22 %	DRI TO EAF STORAGE HOPPERS	100.0%	6 0.3527	0.000	0.353	46.3%	92.80%	0.3273
322	GAS QUENCH O/F WATER TO CLARIFIER	%0:0	0.0000	74.119	74.119	%0'0		
323	INERT GAS (MM Nm3/YR)	%0:0	0.0000	43.000	43.000	%0.0		
324	DRI SCREEN FINES TO EAF INJECTION	100.0%	0.0147	0.000	0.015	1.9%	92.80%	0.0136

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)
STEELMAKING/LMF (PFD-009)
STEELMAKING/LMF (PFD-009) IMSDRI30 16-Sept-1999

16-Sept-1999	IO EAF - NO	- SISAB	CITER INCINCING CITER STORE HEST	8.000 HRS/YR EAF/LMF/CASTING OPERATION	-/CASTING OPE!	RATION		
Revision A:	Revision A: OREAF STEELMAKING/LMF (PPD-009) STREAM STREAM LABLE	SOLIDS %	DRY SOLIDS	LIQUID	TOTAL	% OF SLAB	%Fe	Fe UNITS (MM T/YR)
NUMBER			(MM T/YR)	(MM I/YK)	(MIM LITE)			
400	TOTAL DRI FEED TO EAF	100.0%	0.000	0.000	0.000	%0.0	92.80%	0.000
401	LUMP LIME FLUX TO EAF	100.0%	0.012	0.000	0.012	1.6%		
402	SILICA FLUX	100.0%	0.000	0.000	0.000	0.0%		.,,
403	MISC. ADDITIVES (Al, FeMn, FeSi, etc.)	100.0%	0.007	0.000	0.007	4.2%	40.72%	0.013
404	STEEL CARBON (CHARGED+SLAG INJ.)	100.0%	0.012	0.000	0.012	7.1%		
405	EAF ELECTRODES	100.0%	0.004	0.000	0.004	1.1%		
406	TOTAL EAF COOLING WATER CIRC. (MM NM3/YR)	0.0%	0.000	70.627	70.627	%0.0		
407	REVERT SCRAP	100.0%	0.050	0.000	0.050	6.5%	%02'66	0.049
408	PURCHASED SCRAP	100.0%	1.028	0.000	1.028	135.0%	89.70%	1.025
409	NET SCRAP CHARGED	100.0%	1.078	0.000	1.078	141.6%	%02'66	1.074
410	TOTAL FLUX & ADDITIVES CHARGED	100.0%	0.031	0.000	0.031	4.1%	41.75%	0.013
411	REFRACTORIES CONSUMMED	100.0%	0.014	000:0	0.014	1.9%		
412		0.0%	0.000	70.627	70.627	%0.0		
413		%0.0	0.000	0.155	0.155	%0.0	25.60%	0.040
414		100.0%	0.020	0.000	0.020	2.6%	48.50%	0.010
415	OXYGEN GAS TO FURNACE (MM Nm3/YR)	%0.0	000.0	11.913	11.913	0.0%		
416	LIQUID EAF STEEL TO LADLE REFINING	0.0%	000.0	1.054	1.054	0.0%	%02'66	1.051
417	PULVERIZED LIME TO LADLE REF. FCE.	100.0%	0.005	0.000	0.005	0.7%		
418	SLAGWIRE DESULFURIZER TO LRF	100.0%	0.0004	0.0000	0.0034	0.4%		
419	ARGON GAS TO LRF (MM Nm3/YR)	%0.0	0.000	0.063	0.063	%0.0		

0.002

1.049

BASE CASE IRON/STEELMAKING WATER & SOLIDS BALANCE (100% SCRAP CHARGE TO EAF - NO OTHER IRON UNITS CHARGED)

16-Sept-1999

IMSDRI30

Fe UNITS (MM T/YR) 99.70% 99.70% 26.99% 80.00% 99.70% 99.70% 31.80% (DRY) %0.0 21.0% 2.4% 11.3% 0.7% 3.1% 3.5% 0.0% 0.0% 20.3% 0.8% 0.0% 1.5% 0.0% % OF SLAB OF DRI FD 0.000 29.206 9.760 0.018 14.125 0.155 0.005 0.024 0.006 0.001 1.052 0.012 0.112 0.007 (MM T/YR) TOTAL 29.206 9.600 0.000 0.000 0.000 0.000 0.112 14,125 0.000 0.000 0.000 0.000 1.052 0.007 (MM T/YR) LIQUID 0 (MM T/YR) 0.000 0,160 0.018 0.0006 0.0003 0.155 0.005 0.024 900.0 0.000 0.000 DRY SOLIDS 0.000 0.000 0.000 (MM T/YR) 0.0% %0.0 %0.001 100.0% 0.0% %0.0 0.0% 100.0% %0.0 0.0% 100.0% %0.0 %0:0 100.0% % SOLIDS Revision A: OREAF STLMAKING/LMF (PFD-009), CASTING (PFD-010) CONTACT COOLING WATER (MM NM3/YR) MOLD COOLING WATER (MM NM3/YR) WATER FOR EAF DUST TRANSPORT STREAM LABLE TOTAL SLAG OUTPUT (AS SOLID) TUNDISH POWDER TO CASTING PULVERIZED LIME FLUX TO EAF MOLD POWDER TO CASTING PROC, COOLING WATER LMF REFINED STEEL TO CASTING SLAG & LOSSES FROM LRF CROP END SCRAP TUNDISH SCRAP LADLE SCRAP SLAB SCALE 506 508 423 507 422 425 501 502 503 504 505 424 420 421 STREAM NUMBER

0.042

0.004

0.024

900.0

0.018

0.974

99.70%

128.3%

0.977

0.000

0.977

100.0%

0.996

99.70%

0.0%

0.999

0.999

0.000

0.0%

0.974

99.70%

128.3%

0.977

0.000

0.977

100.0%

TOTAL CAST SLAB PRODUCT

510

NET STEEL TO CASTING

209

THIN SLAB TO HOT BAND

511

HOT BAND TO SALES

513

SLABS TO SALES

512

0.000

99.70%

0.0%

0.000

0.000

0.000

#DIV/0i

0.000

99.70%

%0.0

0.000

0.000

0.000

100.0%